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Experiments of Sir David Brewster and Helmholtz on the Solar Spectrum.

BY OGDEN N. ROOD,

Professor of Physics in Columbia College.

THE process of taking a photograph may be considered as a twofold one; first, certain moderately well-understood optical principles are called into play, whereby a more or less perfect optical image of an object is produced; after this has been done, certain chemical laws are set in action by the photographer, by which some of the features of the optical image are seized on and recorded. Our knowledge of the latter set of conditions is still very imperfect, though we may hope from results lately obtained by such investigators as M. Carey Lea and a few others, that we shall not always remain in this ignorance.

Hence very naturally, photographers have always felt a certain curiosity, with regard to the construction and optical properties of their lenses, and not a few have extended this interest to the subject of light itself.

It is my object in this communication to give a short account of a very remarkable set of experiments on the solar spectrum, made a few years ago, by one, who may probably, with justice, be regarded as the greatest German physicist now living. This investigation, for reasons that will presently be evident, attracted at the time some attention in England; but so far as I know, it has received no notice at all in this country, and I have met only a few American scientific men, who had even heard of it, although some of the experiments described are very beautiful as well as striking, and can easily be repeated by any one.

Sir David Brewster, who, until his most unfortunate controversy with Wheatstone respecting the stereoscope, was almost universally regarded as the first living optician in England, published, in the year 1831, the results of his analysis of solar light. Owing to the well-earned fame of this distinguished man, as well as to the new and startling facts adduced, this paper attracted much attention, and the views there laid down seem to have been pretty generally adopted in England, as well as on the Continent. They shortly found their way into all the text-books on Optics and Physics, where they still remain, for the most part uncontradicted.

The conclusions deduced by Sir David Brewster from his experiments were as follows: 1st. That the solar spectrum consisted of three primary colors only, they being red, yellow, and blue; 2d, That these three kinds of light exist at every point of the solar spectrum with a variable intensity. He contended that the red, for example, overlaps the yellow, and by mixture with it produces the orange, and that by the joint presence of the red and blue, the violet at the end of the spectrum is generated. Further, that the yellow rays by their extension into the blue space produce by mixing with the blue rays light of the color termed green, &c. Brewster was led to this theory, by studying the effects produced by plates of

colored glass on the solar spectrum, the latter being generated by a single triangular flint glass prism. He contended that the eye itself gave evidence of the existence of red light in the red, orange, and violet spaces, and that by passing the indigo and blue rays through olive oil, these rays became of a violet hue, thus rendering evident the presence of the previously disguised red rays. By the same kind of reasoning and similar experiments with cobalt glass, port wine, pitch, and balsam of Peru, he satisfied himself that yellow and blue light also extended throughout the entire spectrum.

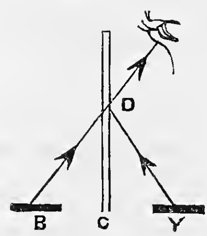
As a necessary consequence of this theory of Brewster, then followed the somewhat singular conclusion, that there were red rays having very various and widely different degrees of refrangibility, or in the language of the Wave Theory of Light, that large differences in wave length were unaccompanied by any change in color. To put this in other words, Brewster in effect reached the strange conclusion, that the sensation produced by the impact on the retina, of waves of light of a certain length, was what we term red; that waves of exactly the same length produced the sensation of yellow, while finally the sensation of blue was the effect produced by a third set of waves, identical with both the others in length. Brewster's views were ineffectually attacked by Airy, Draper, and Melloni; they were presently adopted, introduced into most text-books on Physics, and are still held by most educated persons in this country.

In the year 1852, Helmholtz, in Germany, took up this subject, and, after making an elaborate set of experiments, showed in the plainest manner that the spectrum employed by Brewster was not pure, and that many of the results obtained by him were thus to be accounted for. To obtain a pure spectrum, Helmholtz first formed a spectrum essentially in the same manner as Brewster; viz., by allowing sunlight to fall on a triangular flint glass prism, but instead of using this spectrum for observation as Brewster had done, he first purified it by isolating particular rays, and refracting them by a second triangular prism of flint glass. When a pencil of pure spectral rays had thus been isolated and purified, say for example the green rays, they remained *green*, though transmitted through plates of variously colored glass; this operation merely diminished their brightness, but produced no effect on their tint.

The spectrum obtained by Helmholtz was so pure, and the diffused light generally present was so completely cut off, that he was actually able to trace with his eye, unassisted by fluorescent substances, the ultra violet, or as they had previously been termed invisible rays, which, as is well known, are powerful agents in doing photographic work.

Helmholtz also showed that other results obtained by Brewster were owing to contrasts; as, for example, where a bright red space was in contact with a much darker red space, the latter often appeared greenish.

Helmholtz then showed *that by mixing the blue light of the spectrum with the yellow light, a white or purplish tint was produced, but in no case green.* He proved also generally that in no case does a mixture of pure blue and pure yellow light produce green, but always tints more or less like those above mentioned, contradicting thus an opinion that is more than a thousand years old. He described a very beautiful way of combining the tints from pieces of colored paper: A plate of clean good glass, one inch in width, is supported as seen in the figure, and one of the colored pieces of



paper is viewed through it; the other is moved till its reflected image is made to coincide with and to overlap that seen through the plate of glass directly. Some samples of blue and yellow paper may thus be made to combine to a tolerable white, by properly regulating the relative intensity of the two images; this latter condition is at-

tained by altering the distance between the pieces of papers. I send with this, samples of blue and yellow paper which give a pretty good result, when the distance, D C, is made two and a half the distance, B Y, the yellow paper being seen as indicated by reflection.

Another simple way of showing these experiments, is to prepare circular discs of white cardboard, and to divide them up by pencil lines into sixteen sectors, painting eight alternate sectors with ultramarine blue, the other eight with chrome yellow. When a disc of this kind is merely held in the hand by a pin thrust through its middle, it can, by a slight tangential blow, be made to rotate fast enough to combine the colors. I inclose a circular disc of this kind, consisting of blue and yellow sectors which by rotation gives a sort of a flesh tint, but no approximation to a green. By varying the size of the sectors, either tint may be made to preponderate. It is true in this mode of experimenting, that the two tints are presented in rapid succession, but not simultaneously, to the same portion of the retina; but nevertheless, as has been proved by experiment, the result is the same in both cases.

Among other remarkable results, Helmholtz found that the *red of the spectrum* with the *green of the spectrum* gave not white light but *yellow light*, also that the green and violet of the spectrum gave a pale blue. The former of these two experiments I repeated a day or two ago with success, and showed it to some persons who happened to be present.

It will now be asked, is all this not most positively contradicted by the experience of every child with its box of toy paints, as well as by the ripe knowledge of all artists, who, as we are told in books on coloring, "generally prefer to compound their greens from blues and yellows?" The theory proposed by Helmholtz to account for this apparent contradiction is as follows: Light reflected from a painted surface is of a twofold kind; 1st. That which comes directly from the surfaces of the little atoms of colored powder; this will, in ordinary daylight, be white, and small in amount. 2d. That light which penetrates through two or more atoms of the pigment, and then is reflected; this is always colored, and colored merely because in its passage through the atoms, certain rays have been absorbed. For example, the white light which penetrates through an atom of ultramarine in this operation, becomes deprived mainly of the red, orange, and yellow rays; the green, blue, and violet rays are left comparatively unweakened. The particles of chrome yellow on the other hand, in the same process, absorb the blue and violet rays, reflecting back the red, orange, and green rays. Hence it will be seen that by the joint action of the ultramarine and chrome yellow, all the rays of the spectrum are absorbed except the green; hence green light alone is reflected back to the eye. This theory I have lately tested by experiment; narrow strips painted with chrome yellow, ultramarine, and the green produced by their mixture were brought at the same time in front of the slit of the spectroscope, and it was found that their spectra had been acted on in the manner anticipated by Helmholtz.

In some cases the resultant tint produced by mixing oil or water colors, is identical or nearly so, with that obtained where colored rays of *light* are mixed; in other cases the results differ more or less, though the most striking examples of difference have been pointed out in this article.

In mixing the rays from colored papers by the method of rapid rotation, much trouble will be saved by constructing a simple whirling machine, the ratio of the diameters of the two wheels being as 1 to 25, when it will not be necessary to divide up the paper into sectors, but a series of circular discs of uniform tints can be used, each having a slit cut from its centre to its circumference. Two discs can then be combined by the aid of these slits, and the relative amounts of the tints can be varied at pleasure, so that with two discs thus prepared a hundred experiments may be made.

[Professor Rood's remarks are strikingly illustrated by the specimens sent. The blue and yellow sectors, when mixed by revolu-

tion, do not form green, but reddish-gray, without the faintest green tinge.

Helmholtz's views have very recently received a striking confirmation in the helio-chromic experiment of Niepce de St. Victor. This physicist has shown that mixtures of yellow and blue never comport themselves optically like true green. That the green of the spectrum impresses his color-plate with a green image, whereas a green produced by mixed yellow and blue gives, first, a blue, and then a yellow image, never a green.]

NEW EXPERIMENTS UPON THE LATENT IMAGE.

BY M. CAREY LEA.

THE singular experiments which form the subject of the present paper, might, if I were disposed, be adduced in support of the theory which I have always advocated, of the physical nature of the latent image. But I hold that the first object of every investigator should be simply truth, and that he who makes this secondary to the support of individual views, is unworthy to enter into the field of scientific research. And upon mature consideration, it appears to me that these phenomena are as easy to explain —or rather as difficult to explain, upon the one view as upon the other. But I do not wish to be misunderstood: if these results seem at first sight opposed to the physical theory, they certainly militate *at least as strongly* against the chemical. Indeed, except under a view which I shall presently advance, they would seem to finally dispose of all existing theories, chemical and physical.

An important portion of these experiments was performed and communicated to me by my friend, Mr. Thomas P. Shepard, though it has been not without difficulty that I have prevailed upon him to allow me to mention his name in connection with them. Those which originated with him I have carefully repeated with concordant results, and can bear testimony to the exactitude and nicety of his work.

In a preceding paper I showed that when an image has been developed upon an ordinary film of mixed iodide and bromide of silver, it can be completely dissolved off by means of acid pernitrate of mercury, and then will be reproduced by a second development. This curious fact receives a remarkable extension from the two following experiments:

EXPERIMENT 1.

A collodion film containing an iodide and a bromide was sensitized and exposed in the ordinary manner. It was then plunged into a hyposulphite bath precisely in the condition in which it came from the dark slide, except that it was washed first under a tap. The plate was left in the hyposulphite bath, not merely long enough to remove the iodide and bromide, and clear the film, but for five times the time necessary for that purpose.

When taken out from the hyposulphite bath, the plate had the appearance of a piece of clear glass, with no trace of a picture, no vestige of iodide or bromide. On the application of an iron developer with silver, a distinct image appeared.*

EXPERIMENT 2.

A similar plate was sensitized and exposed as before. The plate was next washed, and, as before, *without development*, was plunged into an acid solution of pernitrate of mercury, made tolerably strong. A very weak solution of acid nitrate of mercury will dissolve a developed image, and leave the iodide and bromide but little affected in the time requisite for dissolving the image. But with a stronger solution and a more continued action, the iodide and bromide themselves disappear.

The undeveloped plate was then left in this stronger solution until every trace of iodide and bromide was removed. It was then well washed, and the collo-developer was applied. *A distinct image was forced out.*

[To those who may be disposed to repeat this experiment, I would remark that a certain amount of care is necessary for success. The solution of mercury must be in a proper condition, and the washing must be

* This experiment is not to be confounded with Mr. Young's, which was executed under different conditions.

thorough. I have succeeded best in the following manner:

Take commercial acid pernitrate of mercury, and dilute it with about five times its bulk of water. Add to this, a weak solution of caustic soda, until it is completely neutralized, which will be indicated by the production of a slight precipitate which does not redissolve. Filter and acidulate with a few drops of nitric acid.

The washing should last for half an hour under a tap. The first affusion of water clouds the clear transparent film by precipitating a basic nitrate of mercury, which, by prolonged washing, dissolves out. Even, however, where the mercury was not absolutely removed, that is, when the washing was shorter, I have succeeded in developing an image, though I do not recommend any but a most thorough washing, without which the experiment will mostly fail.]

It is not to be imagined that the image thus obtained is a shadowy thing, leaving the observer in doubt as to whether or not it is there. The image is at first faint, but regularly strengthens; the plate is apt to be foggy in spots, but not all over. I have developed one of these invisible images upon a plate as transparent as clear glass, and brought it up to full printing strength. Part of the plate was cloudy, but in other parts, as bright and unveiled as the best negatives made in the ordinary manner. The deep shades were presented by clear glass, the high light as dense as could be wished. This is not a result that can be often obtained, but the fact is there, that such a thing is possible.

The point which at once presented itself for determination was then necessarily this: if these powerful solvents are incapable of dissolving the foundation of the latent image, let us know exactly what they are capable of dissolving, and we shall get some clue as to the nature of the image, and what it rests on.

Of *hyposulphite of soda* we know this: that it readily dissolves iodide and bromide of silver, but not metallic silver. As to its action on subiodide of silver, nothing seemed to be known. The point was, therefore, examined in the following manner:

Pieces of glass were coated with metallic silver,—not the pulverulent silver thrown down in photographic developments, but with a bright specular film, such as is used for silvering mirrors for optical purposes. Such pieces were then thrown into a weak alcoholic solution of iodine until the surface of the silver was converted into the dark subiodide. Pieces so acted on were cut into halves, one half was thrown into a strong solution of hyposulphite, and left in it very much beyond the time for which hyposulphite is usually applied—for half an hour or more. These pieces, when washed, were carefully compared with their respective halves, and were found to be unchanged. Evidently, if hyposulphite had been capable of dissolving subiodide of silver, the dark coating must have been removed, and the bright silver laid bare. Nothing of the sort appeared, and it therefore necessarily follows that subiodide of silver is not dissolved by hyposulphite of soda.

Taken by itself, this result seems to give a strong confirmation to the views of those who have maintained that the latent image is produced by reduction of iodide to subiodide. For, it will be said, when the exposed and undeveloped plate is thrown into hyposulphite, the latent image consists of subiodide, and resists the solvent, whilst the iodide is dissolved. But this view is most effectually negatived by what follows.

Acid solution of pernitrate of mercury is, as we have seen, capable of dissolving iodide and bromide of silver. To test it on other points, similar pieces of silvered glass to those above spoken of, were, after treating with iodine, plunged into precisely the same bath of pernitrate of mercury which had been used for the sensitized plates. I do not here mean a similar bath, varying possibly in strength or acidity, but the bath itself which had served for the previous experiment. In a few moments everything disappeared from the surface of the plates, silver, iodide, and subiodide; and clean glass alone remained behind. This experiment was repeated over and over again with different specimens—always with the same result.

Nothing, therefore, can be clearer than that neither silver nor its iodide, nor subiodide can resist the action of the mercurial

solution. And yet a sensitized and exposed plate can be exposed to the action of such a solution, and the latent image escapes its action, and retains its capacity for development!

How are these phenomena to be accounted for?

I think the explanation is as follows: The latent image is twofold in its nature. When the collodionized plate is plunged into the silver solution, I believe that besides the iodide and bromide of silver, there is formed a compound of silver with some constituent of the collodion, which silver compound is sensitive to light, though in a less degree than the silver haloids. This organic silver compound appears to be insoluble in hyposulphite of soda, and in the mercurial solution, and thus, whilst the iodide and bromide are dissolved, this organic compound remains. The latent image impressed upon the iodide and bromide is of course removed when they are removed. The weaker image impressed upon the organic compound, which in the regular development is probably of little importance, in the experiments here recorded becomes the sole basis of development. And this development takes exactly the form which, were this explanation correct, we should expect to find. It is greatly inferior in strength to the regular image, requires careful management, long action of iron and silver, and only in exceptional cases and by unusual good fortune can be brought up to the usual strength of negatives.

Such, I think, is the only explanation of which the facts which I have recorded admit, and it is strengthened by some additional trials which I will presently give. But just here there is another word to say in connection with the foregoing.

In speaking of the latent image, a good deal of uncertainty has arisen from experimenters omitting to make it clear whether they refer to that on the ordinary mixed iodide and bromide films, or on pure iodide of silver. The latent image *par excellence* is, that on iodide free from bromide, and as the first experiments here recorded were made with ordinary collodion films, containing also bromide, I resolved to repeat the more important of them on a film of pure iodide, lest in any way the remarkable results obtained should be ascribed to the presence of bromide of silver.

Inasmuch as it has been lately asserted that some of the commercial iodides contain a considerable quantity of bromide, I used iodide of sodium which I myself prepared from a fine specimen of iodine obtained from Rousseau in Paris. Eight grains of this were added to an ounce of plain collodion, which was used a few days after mixing. The iodide of sodium having no excess of alkali present, quickly colored the collodion, which was pale sherry color when used. A plate coated with this collodion was sensitized in a new bath, to obviate the possibility of any assertion that bromide could have been communicated by a bath which had been used with an ordinary collodion. This new bath contained no nitric acid, but was very faintly acidulated with acetic.

This plate, so sensitized, was exposed, plunged into the mercurial solution till perfectly transparent, and washed for half an hour: an iron developer (of course, with the addition of nitrate of silver), brought out a distinct image. It thus clearly appears that in this respect a film of pure iodide of silver behaves in the same way as a mixed one of iodide and bromide.

I now pass to the consideration of one or two subsidiary experiments, which tend to strengthen the views which I have presented above in explanation of the phenomena described.

1. In order to isolate, if possible, the action of the organic compound of silver which I have supposed to exist, and to form a developable image under the action of light, the following trial was made:

A plate was coated with a moderately old iodo-bromized collodion, was then thoroughly washed till every trace of alkaline iodide and bromide was removed, and was then placed in the nitrate bath.

Here two things are to be remarked: first, it was necessary to use an iodo-bromized collodion, and wash it, not to simply use a plain collodion, because collodion which has been exposed to the action of iodides and bromides contains organic substances of a very different nature from plain collodion.

Secondly, this experiment must manifestly be inconclusive if it had a negative result, because the organic substances which I have supposed capable of forming a sensitive compound, might very likely be soluble in water. In such case, it would be removed by the washing, along with the iodides and bromides, though under ordinary circumstances it might form an insoluble compound with the silver, and then remain in the film.

This plate, after resting in the nitrate bath, was exposed, but no image could be developed on it. As I have just explained, this result must simply be considered as inconclusive, and not as showing that no organic compound of silver is formed under the regular treatment.

2. If an organic substance exist in the collodion capable of forming a silver compound insoluble, not only in water, but in such a solvent as acid nitrate of mercury, then by plunging a sensitized plate into the last-mentioned solution *before exposure*, it ought to retain a portion of its sensitiveness. *Experiment showed that this was actually the case.* An iodo-bromized plate, sensitized in an ordinary negative bath, washed, immersed into a solution of acid nitrate of mercury, and then thoroughly washed and flowed with silver solution, was given a rather long exposure in the camera. A prolonged development with the collo-developer brought out a faint but perfectly evident image.

This last experiment very strongly supports the view which I have here brought forward, that the sensitive image is double in its nature, light impressing both the iodide and bromide, and also some organic compound formed at the expense of the collodion itself, or rather its decomposition products. I need hardly remind my readers that Van Monckhoven remarked some time since that old collodions gave a heavier precipitate with a silver solution than could be produced by the iodide and bromide which it contained. That photographer, indeed, was disposed to attribute this additional precipitating power to the presence of nitro-glucose, but in that case it would seem as if the capacity for acquiring sensitiveness ought not to be removed by washing after collodionizing and before immersion in the nitrate bath.

Finally, I may remark that if I am right in the view here expressed, that in an ordinary sensitive collodion film there is another sensitive substance present, besides the iodide and bromide of silver, it will, on the one hand, greatly increase the difficulty of deciding correctly upon the nature of the latent image. And on the other hand, the recognition of this fact will tend to prevent the drawing of incorrect conclusions from experiments made in these directions. As for example, it entirely refutes the conclusions drawn from Young's experiment by those who advocate the chemical theory, and leaves them without a single well-ascertained fact on which to base their hypotheses.

THE MAGNESIUM LIGHT.

BY REV. H. J. MORTON, D.D.

The time has been when the sun was considered a very important agent in "all the things done under it." Particularly dependent upon his rays was photography. A dark, drizzly, sunless day was death to art. The disappointed operator requested his customers "to call some other time," and as to printing negatives taken under more auspicious skies, it was dull work and discouraging. But now, science seems preparing to dispense with the sun, and moon, and stars, save as objects of art, and to make its own sun and its own independent source of illumination. It seems, indeed, very strange to sit at night, in a closed room, and be "focussed" and "posed" with a view to a portrait! The gaslights in the candelabra and chandelier send cross rays and tangled shadows, and we do not see how a picture can be produced that shall be other than confused and unnatural, even supposing it possible that it should be produced at all by such illumination. But the photographer has secured another servant. He adjusts, in a sort of "tin kitchen" furnished with a funnel at the top to carry off the smoke, a few strands of magnesium wire. Bright, beautiful, like so much silver. These strands hang in this tin receptacle; the focus of it directed towards the group or indivi-

dual to be photographed. The camera is arranged; the magnesium wires are ignited by a match or candle, and at once the room is filled with a light as of midday! The gas jets disappear as luminous objects; nay, they actually cast *dark shadows!* The brightest flame of gasburner or wax candle becomes black and lustreless in this superior light. The new sun of science, like the old sun of nature, quenches all lesser luminaries, and causes them to disappear from the bright sky of its fleeting noonday. In the meanwhile, during the few brief moments of this strange illumination, the sensitized plate in the camera has received a clear and perfect impression of the objects reflected upon it. Twenty seconds suffice for the exposure of the plate, and about twenty seconds is the limit of the magnesium light as thus arranged. The wire drops in white flakes to the bottom of the tin reflector, and then the gas jets in chandeliers and brackets appear again, and resume their function of illumination, and we are conscious how very yellow their light is, compared with the white light of the burning metal.

The pictures thus formed are (as will be seen by the specimen printed in this number of The Photographer) very peculiar. The details are distinct in all important parts, while there is a grand massing of shadows which reminds one of Rembrandt's best compositions, and a softness and richness which belong to no other style of photograph.

The value of this light in photographing "interiors" is obvious, and has already, to a certain extent, been demonstrated. The dark bowels of the pyramids, so long subjects of description, have been made (despite the want of air under which these depths labor) visible to the spectator, who can now sit in his comfortable well-ventilated room, and see all that the actual explorer of those labyrinths beholds, after leagues of travel and weary hours of hot, perspiring, dusty toil. The grand and solemn arches of the cathedral, which since the day they were built have hung up in the dimness of an obscure twilight, spring forth under this new power into visible and beautiful distinctness, and the spider that has woven his web up in heights where he fancied himself secure in his semi-night, hurries away and leaves the meshes of his net hanging like silver threads among the rich tracery of the fretted groins and graceful sculptures of the towering roof.

It may be interesting to ask why this light from burning magnesium wire is thus efficient, while the strongest gaslight fails of producing any effect upon the sensitized plate.

Dr. Thomas Woods has communicated to the Philosophical Magazine, an account of experiments undertaken for the determination of the thermal equivalent of magnesium. From these experiments it appears that this metal exceeds all others in the amount of heat developed by its combustion. Thus the rare metals sodium and potassium formerly took the lead as heat-producing bodies, but comparing equal weights, it is found that magnesium produces three and a half times as much heat as potassium.

When magnesium wire or ribbon suffers combustion, this relatively enormous amount of heat is concentrated in a small space, and acts upon a trifling amount of matter; it therefore follows that the intensity of the heat or light or actinic vibrations produced, must be excessive, and that we might expect to find, what we do in fact discover in its rays, an unusual abundance of those quick waves, high notes, or actinic beams of light, which are potential in affecting the sensitive film.

The Ferro-Gelatine Developer.

Mr. Edward L. Wilson.

Sir: In reply to your letter of November 4th, requesting me to furnish you with the results of some experiments made with a modification of Mr. Lea's Ferro-gelatine developer, I have the pleasure to forward to you a few negatives with prints, and a short account of the process by which they were obtained. The imperfections due to the collodion, impure bath, and careless manipulation, will be ascribed not to the developer, but to my own want of skill, and to the fact that I have had but little time to devote to the fascinating art.

Shortly after the appearance of Mr. Lea's description of his developer in the June number of The Photographer, four efforts

were made to prepare it, in accordance with his formula, the simplicity of which seemed to afford no ground for error, in the last of which the Pulvis Ferri of the Pharmacopœia, which is pure iron in a state of minute division, was used, to insure the saturation of the sulphuric acid.

In each instance the result was the same; no image could be made to appear, and the plate remained as clean as though the lens had not been uncovered, until at length the free nitrate of silver was decomposed into a black precipitate. It was evident that the gelatine had been so changed by the sulphuric acid as to restrain entirely a solution which must contain about 100 grs. of sulphate of iron to the oz.

When exposed to heat with dilute sulphuric acid, gelatine undergoes a change somewhat similar to that by which starch is converted into glucose, and is transformed in part into glycocene or gelatine sugar, a crystallizable substance, which will be found described in the standard books on chemistry. I proposed to induce this change, and to use the product with a solution of iron of a known strength. One ounce of gelatine was boiled in a mixture of three ounces of water, and one fluid drachm of sulphuric acid, and when a portion of the mixture corresponding in strength to Mr. Lea's solution was neutralized with ammonia, and used with a solution of iron of 30 grs. to the oz., no sign of an image could be produced. After great dilution of the gelatine, the iron solution remaining of the same strength, the high lights alone were developed, and negatives equal in hardness to the worst under-exposed and over-intensified tannin plates were obtained.

A further dilution of the gelatine, even to a fabulous extent, afforded the restraining effect desired, and gave negatives transparent in the deep shadows, delicate in detail, and dense enough to print without any further intensification. The energy of the altered gelatine is shown by the fact that by Mr. Lea's formula, 15 oz. of developer are made from one ounce of gelatine, by avoiding carefully the application of heat, whilst by the modification herein described, the same quantity of gelatine, after having been exposed to a high temperature, will replace as a restraining agent the acetic acid in 64 gallons of the ordinary solution of iron. However problematical this statement appears, I would remark that any one who employs the "rule of thumb" with this substance will meet with disappointment, since the altered gelatine cannot be used with benefit in quantities much greater than those which I have been at some pains to discover thus empirically. The formula can, of course, be varied by every practical man to suit his own convenience by adhering to the same proportions.

℞.	Gelatine,	1 ounce.
	Water,	3 "
	Sulphuric acid,	1 fl. dr.

Add the gelatine to the water and acid mixed in a glass or porcelain vessel, place it in a sand or water bath, and boil for thirty minutes, or until the solution does not gelatinize on cooling. After it has become cold, add water sufficient to make it measure 4 oz.

This may be designated solution No. 1; it is acid, since the sulphuric acid has not been decomposed, and will probably keep indefinitely.

Since acetic acid will not be required, I have endeavored to provide a substitute for this old favorite in the solution No. 2, which is made by adding one fluid drachm of solution No. 1 to one pint of water. To prevent decomposition, add to it two drops of creasote dissolved in one drachm of alcohol. This pint, which is proposed as a substitute for acetic acid, and one or two ounces of which will be enough for one pint of solution of iron, contains a little less than two drops of free sulphuric acid, which can be conveniently neutralized by adding to it a small portion of prepared or scraped chalk, but since the pint of *developer* will contain but one-eighth to one-fourth of a drop of acid, I see no great necessity for the use of the chalk.

To make the developer, I prefer a saturated solution of sulphate of iron, each drachm of which contains about 25 grs. of the salt.

℞.	Saturated sol. of sulph. iron,	2 ounces.
	Solution of gelatine No. 2,	2 "
	Alcohol,	½ "
	Rain-water,	12 "

Each ounce of the above contains 25 grs. of iron and 1 drachm of the solution of gelatine. It can easily be diluted one-half for outdoor work. Most of the negatives were developed with this formula.

The collodion used contained 5 grs. of cotton in 1 ounce of equal parts of alcohol and ether, and was bromo-iodized with magnesium; with an acetic acid developer it was found impossible to produce negatives with sufficient vigor and contrast to print well without re-development, which, with its loss of valuable time and its numerous failures, rendered outdoor work more vexatious than pleasurable, but upon substituting the solution of gelatine, clean, vigorous, soft negatives, full of detail, and yet, intense enough to print, could be obtained by the first application of the developer.

A series of experiments have been made with a binocular camera, upon glasses cut with a diamond, and broken apart after exposure to test the gelatine with acetic acid with a solution of iron of the same strength. In every instance, and under the same circumstances of exposure, the gelatine produced the more intense image with the same amount, if not more detail.

The main object has been to obtain a developer which, with good collodion, bath, and proper exposure, would yield a good printing negative on the first development, and it appears to me, with a limited experience, that that result has been attained. None of the negatives have been re-developed. When more density is required, a solution of silver or a few drops of the bath can be added to the developer, and poured upon the plate before fixing, or exposure to light. Its superiority to acetic acid for rapidity of work is shown by the fact that I have taken twelve negatives in a short afternoon, all dense enough to give good prints on the first development, when, with acetic acid and consequent re-development, I should have been satisfied with one-third of that number. It seems to possess the advantages described by Mr. Lea, since it flows over the plate with some degree of viscidity, mixes fully with the solution of silver before the image begins to appear, is hence less likely to cause stains than acetic acid, is equally as sensitive, gives, I think, more detail with the same exposure, and so holds in check the deposit of the silver that the image gains its proper density slowly, and finally it seems impossible to produce any fog.

That the active agent is glycocine is rendered probable by the microscopic examination of solution No. 1, in which numerous beautiful needle-shaped crystals can be seen, and by the addition to it of an equal volume of strong alcohol, in which glycocene is insoluble, and which causes a white precipitate composed entirely of these crystals. The minute quantity required to restrain the iron is the most remarkable feature, since a pint of the developer cannot contain more than from one to two grains. But for an unavoidable interruption of my experiments, I should have endeavored to isolate the glycocene, and ascertain whether to it alone is to be ascribed the advantages of the ferro-gelatine developers.

Be the theory what it may, all photographers will be placed under obligations to Mr. Lea for his introduction of this novel but valuable element into the mysteries of the dark-room.

I am, very respectfully,
Your obedient servant,
William Thomson,
Brevet Major and Ass't Surg. U. S. A.

Douglas Hospital,
Washington, D. C., Nov. 16, 1865.

THE "CUTTING BROMIDE PATENT."

For some time past much excitement has prevailed throughout the photographic community with respect to the so-called "Cutting Bromide Patent." This excitement has been rapidly increasing of late, and since the decision in the case of Tomlinson *v.* Fredericks, in New York, it has attained a great height.

Societies were formed in Boston and New York "to resist it to the very death," and quite large sums of money were placed in the hands of the several treasurers to defend any one who might be prosecuted for non-compliance with the terms of the patentee.

Our own mind being unsettled upon the

subject, and unwilling to lead our readers in the wrong direction concerning the matter, we have habitually refrained from advancing any argument or opinion, until some test case might be settled, and we be enabled to judge of and publish correct and reliable information upon the affair in general.

The recent decision alluded to having awakened many of our subscribers, who have written to us for information, we felt bound to make proper inquiries, and, if possible, to get at the *truth* of the matter, and publish the facts. Our sympathies have ever been with the photographer, and not with the patentee; and we confess to a spirit of resistance having had possession of our mind upon the grievous question.

At the same time, we were disposed to do right, and to lead those who look to us for information in the same direction. It would take an immense volume to state the evidence in the late case given on both sides, and we will not, therefore, attempt to argue the case, except as to the three principal arguments photographers have used in endeavoring to resist and defeat the patent, as follows: First, that the patent ought never to have been granted; second, that the patent only claims the use of bromide of potassium in collodion, and could not, therefore, interfere with the use of other bromides; and, third, that in every instance where the claims of the patentee had been resisted, and the case brought up for decision before a legal tribunal, it went by default.

Now, as to the first, we have every evidence that the patent *was* granted (see Patent Office Reports), and none that it was not. It was for the learned Commissioner of Patents to decide whether it ought or ought not to have been granted, and not for us. That it *was* granted, we cannot get over; and be it considered ever so great a monopoly, it is our duty as good citizens to submit to the infliction the law may place upon us, be it ever so grievous and unreasonable. Further than this we need express no opinion on this point. We are sorry to have to confess ourselves beaten against our will, but a sense of duty to all interested compels us to do so.

Touching the second claim against the patent, we would say, that in the eyes of the law it covers the use of *all* the bromides with collodion, no matter what kind they may be, because they are not excluded. In defence of this, we would cite the language of the court in the case of Bryan *v.* Farr, 1st volume Curtis' Reports, page 263, as follows: "The use of a known equivalent is an infringement. Although the patentee has not expressly claimed equivalents, he is understood to embrace them, and, in contemplation of law, does embrace them, without any express mention." As a legal point, we learn in conversation with a learned patent lawyer, this fact is well settled in many other cases; but for the present let us be content with one disagreeable fact so much against us, for here, we think, we are entirely defeated, and one of our strongest points taken away from us. Few photographers, perhaps, knew of this decision, but upon applying it to other patents will discover how just it appears to be.

Now, respecting the third point, without bringing to remembrance old cases, we will speak only upon the one before alluded to, that being the most recent and consequently the most important one to us. The report has been circulated that this case, which all knew had been pending for nearly four years, had gone by mere default, &c. &c., and that the published statement that Messrs. C. D. Fredericks & Co. had settled with the patentees by the payment of nine hundred dollars, was all a fallacy. Now we will state what we believe to be the *facts* of the case, having had an interview with the parties on one side, and seen a written agreement of the parties of the other side, and with whose signature we are well acquainted, given to their opponents, and thus are enabled to give the truth, which is this:

Messrs. Fredericks & Co., by their counsel, first made an effort for a continuance of the case, and failing in that were compelled to submit to a decree against them for want of sufficient evidence to defeat the patent.

The only adjustment made by them was in reference to the amount of damages, which was arranged at the sum of nine hundred dollars, covering costs and damages,

and which they paid. Of this we have sufficient evidence to convince us, having, as we said before, seen such papers as leave no doubt in our mind as to the truthfulness of this statement, and which ought to convince any one.

Bitter as this pill may be to all, we are compelled to swallow it with our friends, and console ourselves with the fact that the time is short and that the dose will not have to be taken much longer. Of course, we do not presume to advise, but if we may advance an opinion, it would be to say that we think we are fairly beaten, and that it would be the cheapest, quickest and best way to submit to the claims of the patentee. Believing all would be interested to know what he proposed to do, we wrote to T. H. Hubbard, Esq., the assignee of the patent, and append his reply to our queries, dated New York, December 16th, 1865, which reads, viz.:

"As to my future management of the patent, very much depends upon the action taken by the photographers. In New England nearly all have settled the matter, and many have settled in other States. Of course, believing as I do, that no defence can defeat the patent, it must be expected that at the proper time I shall take stringent legal measures with each and every one who refuses to adjust the matter upon the terms which I propose, and which I submit as fair. I claim as infringers all who use a 'Bromo-Iodized Collodion' for photographic purposes. And my terms of settlement are as follows, viz.: A license to any first-class operator to March next, covering all past infringement, for fifty dollars; and to second-class operators, twenty-five dollars; and where operators desire to settle the matter at once, for the term of the patent, a reasonable discount is made. Ten years of the life of the patent has expired, and it cannot now be expected that I shall bring one suit to allow a further test of the matter, for such a course is now impracticable. I must, to be true to the trust reposed in me, take legal measures against *all* who refuse compliance. I *think* I understand my rights in this matter, and time enough has been *taken* by photographers to patiently investigate and settle in their own minds what theirs are; consequently, the interests of all parties require no further delay. I believe I have now answered all your inquiries, and I tender you my sincere thanks for taking the trouble to investigate, prior to announcing a conclusion. I only wish *all* who are interested would do the same."

The assignee leaves it to photographers to judge whether they are first or second-class galleries. He proposes to visit every photographer in the land through agents, and through them to carry out his intentions and secure his legal rights.

As an injunction can be placed upon any gallery whose owner resists, and the same be closed up legally until the case be decided, in view of the terms proposed being reasonable, it is for photographers to decide whether to resist or succumb.

Fifty dollars for one year covering all past claims, or one hundred dollars for the whole term and all past infringements for a first-class gallery, and one-half that sum for second-class ones, does not seem unreasonable. Even better terms than this might be secured from the assignee if he is spared the expense of sending an agent to you to settle. These terms are offered to all in the United States and Territories, except New York City and Hudson County, N. J., where the patent is owned by Mr. Tomlinson, whose claims are much more exorbitant, though we cannot state them exactly. Those outside of that territory desiring further information should address T. H. Hubbard, Esq., 71 Broadway, New York. With regard to the late meetings held in New York, which we have noticed elsewhere, we would add that we learn that the organization is about to fall through, many of the members having settled with the assignee. We trust we have now said enough to satisfy every one.

ON THE COLLO-DEVELOPERS.

BY M. CAREY LEA.

It is naturally a matter both of interest and pleasure to me that experiments should be extensively made with the various forms in which my new developer can be used, and it has never occurred to me that those who made these investigations would con-

sider these results as otherwise than slight modifications of a general principle proposed by me;—modifications, as to the advantage of which each might have his own opinion, and generally as tending to slightly diminish the trouble at the cost of perhaps obtaining inferior results. A friend has called my attention to certain expressions, which seem to come near to being claims such as appear to me inconsistent with the true state of the case, and though I have little disposition to take my own part in the matter, I do not feel disposed to allow my silence to be misconstrued.

My object in first using gelatine was to obtain with its aid a sulpho-conjugated acid, and I took the usual means known to chemists, and by which the multitude of such copulated acids described in our text-books, are formed—that is, I put the free acid in contact with the gelatine, and subsequently saturated it with a base.

This, it will be observed, was a perfectly original step in two quite different respects. No one had previously started with free sulphuric acid, and no one had before used the substances produced by the action of free sulphuric acid upon gelatine.

Whether a sulpho-conjugated acid is really formed, or whether it is the presence of glycocine or leucine that produces so remarkable an influence on the development, is not yet clear, nor have I had much time or opportunity to consider it. If a sulpho-conjugated acid were formed, it might exercise its action in combination with another base as well as iron.

That definite compounds are formed, is quite certain. One of these I have obtained in clear, colorless prismatic crystals, of some size: it appears to be a body hitherto unknown and undescribed.

Whatever may be the substance produced from gelatine, and which controls the development of the latent image in so remarkable a manner, it is due, as I believe, to my investigation. Its action is perfectly manifest through all the modifications of preparation. The resultant image is characterized by a peculiar slate color, or by a strong cream color. Often these two shades appear in a single plate: the highest lights will be cream color by reflected light, and all the rest slate color. And that striking peculiarity of absence of tendency to fog, even in the most exaggeratedly protracted developments, is also shown by the several modifications.

If any one were to suppose that because I have published but two or three processes, I have not examined the whole range of methods, he would be much mistaken. I published those which I did, because, up to the time of their publication, they were what had given me the best results, and I experienced no little amusement to find methods which I had tried and rejected as not even worthy of a passing word in my first article, brought forward as improvements of my process!

This is a topic on which I have no disposition to enlarge, and I shall conclude by simply remarking that all processes which have for a basis the use of gelatine modified by sulphuric acid, are merely modifications, more or less trivial, of mine. And as to the merit of the modifications so far proposed, I will simply refer to the leading editorial article of the British Journal of the 3d November, in which the writer, after carefully reviewing his experiments over the whole range of subject, remarks:

"Upon the whole we much prefer the developer first propounded by Mr. Lea. By attending to the directions, and following the instructions laid down by the discoverer and ourselves, its preparation is very simple, and its cheapness is a recommendation not to be despised. It acts more energetically than any other developer, keeps in good working order for at least four months after preparation, and when made in a concentrated form, will be found very convenient for the travelling photographer."

Since the above was written, I have a curious instance of the manner in which one person's observations are appropriated by, or at least attributed to, another.

Not many months ago I published a method of obtaining scarlet negatives with the aid of Schlippe's salt, and formulæ for preparing the salt itself. The process received, as one would suppose, sufficient publicity at least, to fix the author's name in connection with it.

In the Italian journal, The Camera Oscura, for October 31, of the present year, I find, what appears from a cursory examination to be a literal translation of my entire paper, but signed "De la Blanchère." My name is not in any way mentioned in the course of the paper, nor would any one unacquainted with the facts, be led to suppose in reading the article that it, or what it describes, was the production of any one but the gentleman whose signature appears at the foot of it.

MAGNESIUM LIGHT, AND HOW TO PHOTOGRAPH WITH IT.

As our present embellishment is a photograph from a negative made at night by the aid of magnesium light, it may be interesting to state how the thing may be done by those who wish to attempt it. We described our first experiments in the last number of this Journal, which were made with the kind assistance of our friend, Mr. J. C. Browne, at his house. Subsequently, we met at the same place for the purpose of making several negatives to print from for our present picture, and we have the pleasure of presenting the result,—not perfect by any means, but the best we have yet seen. For this we owe much to Mr. Browne, and also to the kind ladies and gentlemen who consented to sit as subjects for the group. But, without further digression from the subject, we will proceed.

Magnesium, it is understood, is a brilliant silver-white metal, somewhat brittle at common temperatures, but malleable at a heat a little below redness. It is of very light weight, its specific gravity being 1.74, or bulk for bulk it is about $\frac{1}{6}$ the weight of silver. It melts at a full red heat, and volatilizes at about the same temperature as zinc. Its lustre remains unimpaired in perfectly dry air, but in a damp atmosphere it soon tarnishes, and becomes covered with a film of magnesia. The most important property of this metal yet known is the facility with which it enters into combustion, and the marvellous brilliancy and peculiar properties of the light that it emits.

An oxyhydrogen light looks almost yellow when burned with magnesium, while the latter is of a beautiful pale blue color, adapting it particularly for photographic purposes. It may be lit with a common match, wax taper, or lamp of any kind, burns with avidity, and crackles and snaps like fresh coal upon a hot fire, or burning fat.

To make negatives with it you want the ordinary apparatus and chemicals used for making sun pictures (these are *not sun pictures*, rĕmember; and the law, wise as it usually tries to be, has not been far-seeing enough to cover the mighty strides of photography, and to levy a tax upon *magnesium* pictures also), two tin reflectors, described below, and a supply of magnesium tapers. Supplied with these, a knowledge of posing and the laws of reflection, proceed to arrange your reflectors. One reflector should be so placed as to be nearly on a line with the top of the head of your subject, and from six to eight feet from him and between him and the lens. The other should be rather farther off, somewhat lower than the first and on the opposite side. The reflector nearest the subject should be supplied with from three to five tapers, and the other with from two to three.

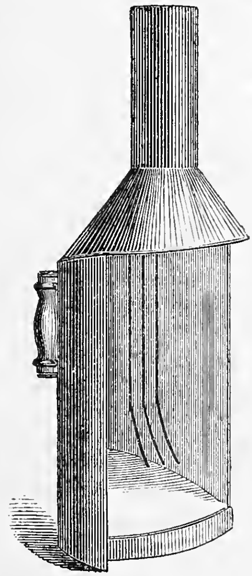
Having this all ready, let your assistant light half a taper close to the subject, while you carefully focus. Having all things in readiness, place the sensitized plate, light the tapers, withdraw the cloth, and expose as long as your tapers burn, which will be from seventeen to twenty-five seconds.

It has been suggested that the stronger light be moved during the exposure to increase the diffusion of the light. Not having completed our experiments, we have that yet to try, but are inclined to think that the plan is unnecessary. As the sitter may find the light unpleasant at first, the face should be turned slightly from the direction of the light. By looking at the face, the effect of the shadows may be easily watched, and changed at pleasure.

The reflectors or burners we have used consist of a sheet of tin bent in a semicircular form, having a pan at the bottom to prevent the burning metal falling on the floor. The top is dome-shaped, with a kind of funnel through which some of the fumes

may be carried away to the external air if required. Within the dome are metal pieces for holding the tapers, and at the back is a handle for the convenience of the operator.

To give a better idea, we present a cut below, showing how the tapers appear when attached to the inside cross-piece, ready to be lighted.



In burning, the oxide will sometimes collect on the surface of the reflector. This should be wiped away occasionally with a woollen cloth. We have made very good pictures with only one such burner, and those who wish to make their preliminary experiments can get very good effects with one. We prefer to have two, however. We have just had one constructed after a plan by Mr. Browne, almost twice as large as the usual kind, and flaring out more. We have to try this yet, and shall record the effects after our experiments.

It will be observed that there are singular-looking shadows or "black ghosts" in the picture, which we must endeavor to avoid. This, we think, we can do in future by lighting up the background, but must lay that aside for future use, and ask others to try it with us, and report the result of their efforts. Much has yet to be learned in the management of this light, and we hope that others will experiment with us, as it is our intention to give the thing a fair and thorough test. It would be well to read the remarks of Mr. Browne upon the subject in the proceedings of the Photographic Society, on another page. Care must be taken in arranging a group that the shadow of one figure should not fall upon the face of another.

The manner in which the draperies came out in these pictures encourages the belief that if we can succeed in lighting the face properly, we can get as good effects as by sunlight. The four negatives from which the present pictures were printed were made in succession, and each subsequent one appeared better than the one before it; so we know that we are improving. The negatives were taken in the same manner as described in our December number, and slightly intensified, as they were wanted for rapid and extensive printing. With the exception of the accessories and the effect of the shadows, they resemble negatives made by sunlight, and print splendidly, as the pictures themselves declare.

It is quite a novelty to have a picture made by this new light. The subject is told what is going to be done, and sits down quite an unbeliever. He submits to the usual *fixation* with very good humor, wearing a look of charity upon his face for the operator, whom he thinks is either over sanguine or crazy to think of making a picture after sundown, and by simply burning one of those curiously twisted metal tapers. However, the arrangements being completed, the show begins, and the metal is lit. What is usually called a well-lit room by gas, becomes at once gloriously illuminated in every part with a most beautiful and pleasant light. The tapers burn with eager haste, as if trying to consume themselves and get out of the way. Little portions of burning metal fall down upon the bottom of the shade, and then crackle awhile and go out. The sitter probably forgets himself; looks around to see the cause of the miniature pyrotechnic and artillery display; meets the glaring reflector, and turns from it with two huge green spots dancing before him, which continue their calisthenics while you go prepare another

negative for the one he spoiled by moving. Sometimes the oxide will remain hanging in the burner of the full size and shape of the taper, looking very curious. The subject must be assured that the noise will not hurt him, and must not be allowed to look in the reflector or towards it. It is only when looking at the burning light in the burner that we have found it in the least unpleasant to our eyes. We can burn a taper in our hand and look at it until it expires without any unpleasant sensation to the eyes. We find that most people can do so, and that the disagreeable sensation only occurs when accidentally or purposely looking at it when burning in a reflector.

There are several kinds of patent lamps for burning the wire in the market, but we think that after a little further trial we can get just as good effects with the tin burner or reflector as with anything else. The patent lamps have the advantage of being more easily regulated, and probably are the most economical, but having tried none of them yet, we shall not make comparisons. The American Magnesium Company have recently perfected a very large and grand affair in the way of a lamp, and have placed one at our disposal to experiment with, which we shall do shortly, and report in our next. It works by substantial clock-work, playing out the wire or ribbon as fast as it will burn. A very ingenious contrivance for scraping off the oxide from the burning point is moved by the clock-work also, and does its work well. We shall probably have a cut of it for our next number. Meantime, buy a shade and some tapers, and join us in experimenting with it.

THE NEW DEVELOPER.

BY F. A. WENDEROTH.

Many have been the devices and suggestions to improve the developer for negatives, but so far as I know they have been crowned with but little success; and the mode of making negatives by the wet process is to-day about the same as it was when I first commenced to practise photography, thirteen years ago. In the management of the silver bath and the manufacture of gun-cotton, great progress has been made, and, in consequence, the results obtained are more uniform than formerly. Thirteen years ago the iron developer was the same as the one now in general use; all additions of organic and other matter have not only proved useless, but in many instances injurious. There is one indisputable fact, namely, that when either the collodion, the silver bath, or the timing has been faulty, no developer of any kind will remedy it. The plainer the developer the better. Iron solution, not so strong as to produce streaks, not so weak as to work slow, and just enough acetic acid to make it flow uniformly over the plate, has, in my hands, proved to be superior to anything else.

A great deal has been said and written about how to obtain dense negatives, which to me are always objectionable. It is soft pictures, with good details in the high lights and in the shadows, that we want.

When Mr. Carey Lea's developer was first spoken of, it was claimed for it as one of its chief properties, to produce dense negatives without re-development, and that negatives would not fog no matter how long the developer was kept on, which, without doubt, is a great recommendation in the eyes of some. With everything in good working condition, and careful manipulation, fogging will be a stranger to the common acetic acid and iron developer, and any amount of density can be obtained by the use of it.

Warned by the experience of others, I did not feel like losing time in trying to make the new developer, but availed myself with pleasure of the opportunity to give it a trial, as Mr. Lea had presented me with a sample made by himself, the results of which I laid before the Philadelphia Photographic Society, at its December meeting.

For comparison, two other samples of developer were used. One was the common acetic acid and iron developer, and the other a modification of Mr. Lea's, published by Mr. Cooper, Jr., some time ago, in the British Journal of Photography. Everything was in first-rate working order. The first negative was developed with acetic acid and iron, to ascertain the proper time of exposure, which proved to be 25 seconds on a

7×9 plate, $\frac{3}{4}$ length figure. The result was perfect in every respect, very clean, plenty of detail in the highest lights, and deep shadows, giving a vigorous and at the same time a soft print. Time of development, 20 seconds; no re-development.

The next plate was developed with Mr. Lea's developer. Time of exposure, 25 seconds. Proved to be under-timed by $\frac{1}{4}$ to $\frac{1}{3}$. Negative clean, with high lights more dense and shadows more transparent and less detail than in the negative with the acetic acid; but I think that with a longer exposure a better result would have been obtained. The time of development was 1 minute and 30 seconds. When the developer first was poured on the plate, it refused to flow evenly, and acted like the common developer with too little acetic acid in it. I therefore had to add 1 oz. of acetic acid to 8 oz. of the developer. I am confident that to have kept the developer on the plate for a longer time would not have improved it, as the high lights were strong enough.

The third negative was developed with Mr. Cooper's modification. Time of exposure, 25 seconds; time of development, $1\frac{1}{2}$ minutes. This developer ran slimy and smeary over the plate, producing air-bubbles, and running off quite stringy. The time of exposure appeared to have been only one-half of what it should have been, too strong in the high lights, and quite black in the shadows. Repeated trials gave the same results.

The color of the negatives is different in the same proportion as the light effect. So the negative by the common developer shows a solid close deposit of silver of white color in the high lights, and brownish in the shadows, looking very much like a sepia drawing. The color of the negatives by Mr. Lea's developer are more grayish, not showing the difference in color, and the deposit of the silver less close. In the negative by Mr. Cooper's modification, the silver deposit is of an almost black color, and not close.

Mr. Coleman Sellers' and Mr. Graeff's reports of experiments showed about the same results as obtained by me. Both had been favored by Mr. Lea with some of his developer; both had worked with chemicals in the best condition; had scratched the plates with the diamond before exposure and before development separated them. One developed with the common acetic acid and iron, the other with Mr. Lea's developer.

Mr. Lea admits the slow working of the developer, but does not think it of importance. Practical photographers might think different, and he would perhaps think so too if he had a dozen or more persons waiting to be attended to, every one taking hold of him as often as he shows his face, telling him over and over again he has no time to wait any longer. In landscape photography it is equally important to work quick, as light effects and the winds are not at our command, and it would be very inconvenient to carry levelling stands whereon to conduct the development at leisure.

Mr. Tilghman, who had succeeded in making the new developer himself, was quite pleased with it, but had not made any comparative experiments. Dr. William Thomson, of Washington City, whose paper was read at the same meeting, seemed to be of the same opinion as Mr. Tilghman, and supported his views by several negatives.

To make comparative tests, it is of the greatest importance that everything used should be in the best order. Was this so in Dr. Thomson's case? No! In the beginning of his paper he says: "The imperfections due to the collodion, impure bath, and careless manipulations, will be ascribed not to the developer," &c. &c. &c. This should end the controversy at once.

But, without telling it himself, a practised photographer would see in Mr. Thomson's negatives, developed with the common acetic acid developer, that his chemicals were in a bad working condition, and the only difference between them and those developed with the ferro-gelatine developer, as modified and prepared by himself, was that the latter were harder; and it was the opinion of several of the gentlemen present, that the prints from the negatives developed with the common developer, were preferable to those by the ferro-gelatine, showing more detail and giving a softer picture, just the reverse of what Dr. Thomson tried to demonstrate. The only point proved by

Dr. Thomson is that, with chemicals out of order, more dense negatives without re-development might be produced by the ferro-gelatine developer of his own make by long development than by the common developer. This is likewise applicable to the experiments of Dr. Tilghman, who said that his chemicals were often in the condition of Dr. Thomson's, and therefore he gave the preference to the ferro-gelatine.

In my opinion the test stands as follows:

	Acetic Acid Developer.	Ferro-gelatine.
For time of exposure, . . .	1	2
For time of development, .	1	2
Certainty, dispatch, and conveniency of preparation, .	1	2
Absence of fogging, . . .	2	1

Of course I do not consider these experiments conclusive, and hope to be able to report at the next meeting of the Society the results obtained by new tests.

PROF. MORTON'S LECTURE ON LIGHT.

On Wednesday evening, November 29th, notwithstanding the inclemency of the weather, our Academy of Music was well filled to hear the second lecture on light, entitled "Shadows," delivered before the Franklin Institute by Prof. Henry Morton.

As announced by the programme, it was the lecturer's intention to illustrate and demonstrate a few fundamental truths in the science of optics, viz., the characteristics of light rays, and the directness of the path of a ray or wave of light, its inability to bend or go around any opaque body in its path, the diverging paths of rays proceeding from a luminous body, and the fact that rays of light may cross and intersect each other in every imaginable way without obstructing each other. This he illustrated satisfactorily by the aid of electric light.

2d. The true nature of a shadow was discussed. "A shadow," he remarked, "is a space into which bodies passing lose their borrowed light." This fact he illustrated by an artificial eclipse of the moon, which was effected by large solid figures of the sun, earth, and moon, the earth moving through the air over the stage with a deep shadow projected behind it, and the moon at one moment highly illuminated by the light from the artificial sun, and the next becoming totally eclipsed by dipping into the earth's shadow.

3d. The profile or section of a shadow, and the effect of inclination of the intersecting plane, was illustrated by experiments with the electric light and by movable screens. Thus shadows were widened, lengthened, shortened, and diminished, explaining why they lengthen in the evening. By the arrangement of screens and other accessories, he explained the natural phenomena of the Spectre of the Brocken or the great ghost of the Hartz Mountains, where, it will be remembered, a person may stand at one point and see his shadow fearfully enlarged at another, imitating his every motion and gesture with laughable accuracy to those who understand it, and with frightful effects to those who do not.

4th. The diverging paths of rays from luminous bodies were experimented with, and the fact that the nearer an opaque body approaches to a luminous source, the more rays will it cut off and the larger will be the shadow which it will project. This action was fully illustrated first with luminous diagrams, then by direct experiment, and lastly by the curious arrangement in which shadows of living creatures were seen to perform the most wonderful actions, leaping as high as the ceiling (forty feet), growing to gigantic size, and stepping away into the ceiling and out of it again.

The audience were shown a pugilistic combat between a pigmy and a giant; and as the fight proceeded the pigmy would swell to gigantic proportions, while the giant diminished to a pigmy. Presently, an enormous shadow of a human hand would grasp both, and carry them off. Again, similar shadows would appear, and while being presented in various fantastic attitudes, a monstrous shadow of a human head would appear, and, opening its enormous jaws, gobble them up.

Many recognized the "gobbler" on this occasion as one who frequently "engineers" in these pages; and the aforesaid giant hand that was made to appear so grasping, was

none the *less* than the hand of the same individual who so generously writes for the benefit of our readers with that same hand.

The same diverging character of light rays was then illustrated by the Phantasmagoria, in which luminous figures seemed to appear at a vast distance and then gradually approach, increasing to great size with a wonderful effect of reality.

Finally, the fact that light rays cross each other without any mutual interference, was fully explained and illustrated by luminous phantoms, in which many figures in variously colored light were shown at once on the screen, projected through the same opening and changing their relative sizes and positions, and by the dance of the twin shadows, in which two shadows, one red and one green, were seen to perform identical motions while constantly changing their relative sizes and positions.

The lecturer was frequently applauded, and to him belongs the distinguished honor of being foremost in the ranks in the endeavor to lead the public tastes in the direction of science.

PHOTOGRAPHIC SUMMARY.

BY M. CAREY LEA.

ENGLAND.

Alkaline Development.—The British Journal contains an interesting editorial on the subject of alkaline development, in which the rival claims of Mr. Glover, Mr. Leahy, and Major Russel are sought to be adjusted. The editors very fairly state that the subject received its first impulse from the observations of Mr. Anthony and Mr. Borda in this country on the effects of fuming tannin plates, and speak of these gentlemen having discovered the agency of ammonia as an *accelerator*, whilst they ascribe to English experimenters the discovery of its agency as a developer.

Now, it is admitted that the American experimenters established the fact that the invisible image on an exposed tannin plate was rendered visible by fuming. Then, if this is not development, what is it? Can the bringing out of a latent image be called sensitizing or accelerating? If so, how is development to be defined? Can it be assumed that the production of a given effect by a given means is "acceleration" in one man's hands, and "development" in another's? If not, it seems incontestable, even on the evidence frankly furnished by the Journal, that the discovery of the alkaline development is due to Mr. Anthony and Mr. Borda, although the method undoubtedly was perfected by the English photographers.

Poisoning by Cyanide.—The News gives another case of poisoning by cyanide attended with very nearly fatal results, and quotes in part an article from the Pharmaceutical Journal on the antidotes to be administered.

As accidents are liable to happen at any time to those who use this poison, they should make themselves familiar with the proper treatment.

That which is recommended by the authors in question, is to mix solutions of a persalt and a protosalt of iron (for example, perchloride of iron and protosulphate) together, add some carbonate of soda, and swallow it. The addition of the carbonate of soda produces a bulky precipitate which must be also swallowed, as the success of the treatment depends upon it.

If perchloride of iron is not at hand, it is better to use the sulphate of iron with a little alkali than to neglect the matter, or wait. A little perchloride can be swallowed as soon after as convenient; it can be obtained of any apothecary under the name of "muriated tincture of iron."

A case is also mentioned in which a sort of paralysis of the arm arising from the use of cyanide, was removed by applying solution of iodine to the parts affected (strength not stated—probably Lugol's solution).

Blistering of Albumenized Paper.—A correspondent of the News mentions that he found that in his own case the trouble had arisen from using his hypo warm, and that by avoiding this, and adding to the fixing solution one-twentieth of alcohol, he entirely escaped the difficulty.

Carbon Prints.—The News announces that carbon printing has at last assumed a definite practical shape, and that Mr. Swan is regularly printing views from first-rate negatives, commercially, with admirable re-

sults, the prints being even superior to silver prints taken from the same negatives.

I received a short time since from Mr. Swan three magnificent specimens of this work—prints about 12×10, in a warm shade, full of brilliancy, and leaving nothing to desire in the way of execution. It is a step of the greatest importance, and it is to be hoped that it may receive indefinite extension.

Woodbury's Process.—Through the kindness of Mr. G. W. Simpson, I have received some remarkable specimens of this process. They are calculated to produce a deep impression, and when we are told that a single workman with two presses can print them at the rate of two hundred per hour, one cannot but feel that prints of this sort, so cheaply made and of such promise of permanence, must work important changes in commercial photography.

FRANCE.

Pyroxyline.—Blondeau has published some new views upon the constitution of this substance. He considers it to be a pentabasic acid, formed by the union of a substance, isomeric with cellulose, which he calls *fulminose*, with nitric acid. In its ordinary condition, it is combined with five equivalents of water. It is also capable of combining with alkalies, and giving rise to the production of substances resembling salts. It explodes at 140° C., and is gradually decomposed at the temperature of boiling water.

GERMANY.

New Lenses.—Steinheil has produced a new form of lens destined probably to play an important part in photography. He has discovered, as it would appear, a mode of producing images, free from chromatic aberration, without achromatizing the lenses. This fact is one which we could not readily receive, were it not so strongly vouched for; it is one also which is not in accordance with our views of dioptrics, according to which a coincidence of the usual and actinic foci could only be obtained by availing ourselves of the difference between the indices of refractive and dispersive powers of different sorts of glass, using a negative lens of the sort having the highest dispersing power, so that a surplus of refractive power should remain, which constituted the effective energy of the lens. This whole system has, it seems, been done away with by Steinheil, and an immense economy attained in cost, inasmuch as more than half the labor is avoided. As yet this system has only been extended to landscape lenses, but there seems no reason why it should not be extended to other forms, unless it be found necessary to work with too small stops.

Great interest has naturally been excited by these discoveries, very few details as to the discovery having yet been made public. I glean the following from German and French exchanges:

Steinheil's lenses are doublets, each lens being a single one, and *both being of the same sort of glass.* They are exceedingly small, and light, in proportion to the size of image, and very cheap. They are slow, apparently slower than the Globe lens, and this may stand in their way for portraiture. A minute and a half is required for views. They work with large stops, give sharp images, and of uncommon size and angle, stated to be 25 degrees larger than the Globe lens, or more. Thus a Globe lens will give a circle of light of which the diameter subtends an angle of 85 degrees, whilst Steinheil's subtend 110 degrees.

The following are some of the particulars advertised by Steinheil for his lenses:

Diameter of Lens in tenths of inch.	Size of Picture in inches and tenths.	Focal length.	Price in thalers.
$.3\frac{1}{2}$	$4\frac{1}{2}$	$2\frac{3}{4}$	16
.8	10	$5\frac{1}{3}$	28
1.5	21	13	42
2.1	30	15	50

These numbers speak for themselves. Their reliability must rest upon the following facts: 1st. Steinheil's character and position. 2d. That Voigtlander has arranged with Steinheil for permission to manufacture these lenses. 3d. That remarkable pictures have been obtained by Albert, of Munich, with them. 4th. That a specimen print 30 inches in width, exhibited at a meeting of the Berlin Photographic So-

(*Concluded on page* 22.)

ON SOME LANDSCAPE LENSES.

PREPARED FOR "THE PHILADELPHIA PHOTOGRAPHER."

LENS.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Back focus. Object 85 feet off.	Back focus. Object ½ mile off.	Difference.	Equivalent focus.	Diameter of circle of light formed by lens in landscape.	Angle covered by circle of light.	Largest picture of usual shape to be cut from this circle.	Angle covered by this picture's longest side.	Largest picture of *satisfactory* definition and marginal lines.	Angle covered by same (longest side).	Diameter of Lens.	Weight of Lens and mounting.	Cost of Lens.	Angle put on, $8\frac{1}{2}\times6\frac{1}{2}$ inches (longest side).
	in.	in.	in.	in.	in.		in.		in.		in.	ozs. avpois.		
Dallmeyer New. Wide angle $8\frac{1}{2}$ inch, ...	9	$8\frac{15}{16}$	$\frac{1}{16}$	8.336	14	80°.3′	8×10	61°.54′	7×9	56°.44′	$1\frac{3}{4}$	$10\frac{1}{2}$	£4.10	54°.2′
Same, 10 inch, ...	$10\frac{1}{2}$	$10\frac{4}{10}$	$\frac{1}{10}$	9.991	$15\frac{3}{4}$	76°.28′	10×12	61°.57′	8×10	53°.8′	2	$10\frac{1}{2}$	£5.10	46°.5′
Triplet, No. 3, ...	$12\frac{1}{2}$	$12\frac{4}{10}$	$\frac{1}{10}$	14.056	18	65°.16′	11×14	52°.57′	10×12	46°.14′	$2\frac{1}{8}$ back lens.	$18\frac{1}{2}$	£6.10	33°.39′
Grubb C. Stop full out, . .	$14\frac{5}{8}$	$14\frac{1}{2}$	$\frac{1}{8}$	14.145	16	59°.0′	$10\times12\frac{1}{2}$	47°.42′	$10\times12\frac{1}{2}$ architectural.	47°.42′	$2\frac{3}{4}$	29	£5.10	33°.27′
Grubb C. Stop half way in, .	—	—	—	—	19	67°.47′	12×15	55°.53′	12×15 landscape.	55°.53′	—	—	—	—
Globe. 12 inch, ...	$13\frac{1}{8}$	$12\frac{13}{16}$	$\frac{5}{16}$	15.846	24	74°.16′	16×18	59°.11′	14×18	59°.11′	$3\frac{1}{8}$	56	$165	30°.2′

The columns 1 and 2 were determined, with a microscope made for the purpose by Grunow, by reading a newspaper focussed on plain plate glass at the eighty-five feet distance, and counting the bricks in the chimney of a house, at the half-mile distance.

For sharpness of definition and brilliancy of effect, the Grubb C lens stands at the head of the list. The new wide-angle Dallmeyers are, however, but little inferior to it in these particulars.

The £ sterling may be taken at $12 currency, for the lens delivered in New York, duty and charges paid, without material error, when gold is at 147.

S.

ciety, excited much surprise and admiration.

On these, the statements must rest. Taken as they are, they are sufficient to create great interest and desire for further information, which, in the next number of this journal, it is expected to give.

Busch, a distinguished German optician, has also constructed a new lens, which he calls the "Pantascopic." Of this it is simply reported by Dr. Vogel that the pictures laid before the Society were "at least equal" to those of Steinheil. One novelty in Busch's is the introduction of elliptic stops. His lenses were to be in the market in February, of six sizes.

A WORTHY TRIBUTE.

At a recent meeting of the London Photographic Society, Mr. Jabez Hughes read a paper "On the Preparation of the Iron Developer so as to produce Dense Negatives," from which we make the following extract:

"I look upon *development* as the most remarkable portion of photography; and in practice, next to the management of light, I think it the most important part of manipulation. It is true, daily practice makes it familiar, but in this case, at least, familiarity should but increase the wonder. While this aspect of the subject is present to our minds, let us dwell on it; and, as we take the exposed plate from the dark slide, before pouring on the developer, let us ask ourselves what we are going to do. We are about to witness one of the most wonderful things in this wonderful world. A few minutes since a ray of light, associated with countless other rays of light, was deep in the sun's photosphere. With its own directness it darts forth, its destination this earth. Onwards and onwards it comes at a speed that our finite faculties, though measuring, can never appreciate. As it approaches our globe it is bent out of its course, here a little and there a little, but onward it passes till it reaches the smiling face of a happy child, fresh as itself from creation. But its mission is not ended; it but stops to kiss the features it illumines, and, at an angle, onward again it goes through walls of crystal into its mystic chamber. There it stops, and in its own invisible manner depicts the thing of beauty it travelled a hundred million of miles to register.

"The marvel is but half complete. *Has* the subtle ray left its impress behind? Is not this plate in the same condition as before exposure in the camera? Can there have been agencies at work so potent as to quite change the nature of the film, and yet so silent and invisible as to leave no apparent evidence behind?

"Who will dare say that depicted on that blank surface is an invisible picture of marvellous beauty? or that concealed in that vacant space is a likeness of God's own image? Yet, mark the change! On the filmy surface pour that unthinking, unconscious fluid, and what was but now a vacant blank becomes an unfolded picture of truth and beauty, such as nature only can paint, and man only can admire. Am I not right, then, in saying that the development of a latent image is one of the most wondrous things in this wondrous world?

"To return to the more prosaic aspect of development: any one who aids us in understanding its mysterious nature or in improving its practice, should be warmly greeted; and I think such greeting is due to Mr. M. Carey Lea, not only for his clever investigations into the nature of the photographic image, but also for the valuable results that have flowed from his introducing gelatine into the iron developer. I am not aware if this gentleman's name has appeared before in the transactions of this Society, but in acknowledging him as the introducer of the gelatino-iron developer, I should like to be allowed to express to him, both as a representative of American photography and personally, the great gratification that a very large section—I think I should not be wrong if I said the entire community—of English photographers experience by reading his numerous and valuable contributions. We scarcely know which most to admire,—his sound practical and theoretical knowledge, his intimate acquaintance with what is going on in all countries (which makes him a cosmopolitan as well as an American photographer), or the amiable and courteous manner in which

he invariably expresses himself. I do not know that I compliment American photographers generally, and him in particular, when I say that I think that the mantle that fell from our own Hardwich seems to have descended on to the shoulders of Mr. M. Carey Lea; for I know no gentleman who, in his various communications, so much reminds me of him whose presence we prized so highly, and whom we were so sorry to lose. Be it Mr. Lea's good fortune long to hold the post of 'guide, philosopher, and friend;' and in that land of fertile intellect may many more arise to emulate him in advancing our common art-science."

The former part of this extract is one of the most eloquent and charming tributes to the wonders of photography that it has ever been our pleasure to read. It *has re-developed* our love for the art, and made us feel that *wet* processes are not *entirely dry*, to speak paradoxically, as we sometimes feel disposed to think when trying to write upon them.

Of the generous and courteous spirit evinced in the latter portion of the same, we cannot speak too highly. Surely, no one more fully deserves the high compliment thus paid to Mr. Lea; and we feel rejoiced to know that he is so fully appreciated abroad. There is no one in this country who is so faithful in experimenting and who has contributed so much to photographic literature as M. Carey Lea, and we heartily indorse the sentiments so kindly expressed by Mr. Hughes.

In this connection we would add that the contributions of Mr. Lea will hereafter be made to this Journal exclusively, and while other occupations prevent him from formally undertaking the editorship, it has his most cordial co-operation.

BARIUM.

We have received the following from a New Orleans correspondent, which seems a very plausible process. We have not been able to experiment with it on account of a press of other work, but, with our correspondent, hope that others will do so, and apprise us of the result they obtain.

"As you well know I have for some time been afflicted with Barium on the brain, and in accordance with homœopathic principles, 'similia similibus curantur,' I applied Barium to all and everywhere, and below are the results; before going any further, however, let me tell you that it is not my intention (for reasons best known to me) to enter into the merits of the question, and try to explain how and by what laws it acts; but it acts, that is the main point; I therefore leave it to you, gentlemen of the pointed hat, long robe and magic rod to decide and expound. But to the point: Sensitizing bath for plain or albumen paper:

Water,	15 ounces.
Nitrate barium,	$1\frac{1}{2}$ "
Water,	14 "
Nitrate silver,	3 "
Alcohol,	1 "

When the solutions are complete, mix and make very slightly acid with nitric acid, float your paper from three to five minutes, and when thoroughly dry, expose to vapors of carbonate of ammonia ten minutes only. Paper so prepared will give prints of a slate blue color, and will tone very readily. After thorough washing, and immediately before toning, immerse your prints in a weak solution of acetate of barium, this precaution will in all cases prevent mealiness. Then tone in following:

Chlor. gold,	3 grains.
Chlor. uranium,	$1\frac{1}{2}$ "
Water,	30 ounces,

made neutral two or three days in advance with carb. barium, and stirred frequently during that time; just before using above, drop in say 5 grains chloride of sodium. Acetate or phosphate of soda can, according to tones desired, be added to this bath. After two changes of water the prints are immersed in hypo. 1 oz. to 5 of water, in which throw 25 or 30 grains carb. barium. With the above mentioned silver bath, I have printed with Roettger's solar camera a half life-size picture in fifteen minutes, when it required with the same negative and nitrate of soda bath one hour.

"By same mail I send you the recom-

mended broomstick, around which please find three prints. The one on plain paper is toned in the gold and baryta bath, and the two on albumen are toned with gold and uranium bath, without baryta or phosphate of soda. The three are sensitized in the silver and baryta bath, and have been printed in one-fourth of the time required for other baths. I do not send these prints as *chef-d'œuvres*, but simply to let you see how far I have progressed in my working of the solar camera. The landscapes are pictures of the interior of my yard, and the portrait is one of my little daughter.

"Very truly yours,

"PROSELYTE.

"NEW ORLEANS, December, 1865."

We cannot speak too much in praise of the prints received from our obliging correspondent. They are all that could be desired in tone and clearness, and nothing better could be wished for. Both the plain paper and albumen prints are very good, as is also the little girl's portrait on albumen paper. We shall be glad to show them to any one calling at our office.—ED.

PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

PROCEEDINGS AT REGULAR STATED MEETING, WEDNESDAY EVENING, DECEMBER 6, 1865.

COLEMAN SELLERS, ESQ., President, in the chair.

The minutes of the last meeting were read and approved.

Colonel Robert E. Patterson and Mr. S. B. Whiting were unanimously elected members of the Society.

Mr. Lea's New Collo-developer having been agreed upon at the last meeting as the subject for discussion this evening was declared in order, and the subject opened by Mr. Wenderoth, who exhibited three negatives of the same subject and a print from each. One negative was by Mr. Lea's developer, the second by Mr. Cooper's modification of the same, and the third by the ordinary iron development.

Mr. Wenderoth expressed the opinion that the first was very good, indeed, but entirely too slow for the everyday operator; the second was good for nothing at all, and the third was the quickest and best of all. After they were inspected by the members, the President remarked that we had heard Mr. Wenderoth's remarks, and had seen the proofs of his experiments, and that he would be glad to hear further remarks on the subject.

A gentleman stated that he had tried the new developer, and considered it a decided improvement.

Mr. Wenderoth referred to the fact that in the matter of keeping it on, the collo-developer was greatly superior to the common iron developer, as it did not bring out what was not affected by the light.

The President said he would state in reference to Mr. Lea's developer, that last week he sent him a sample, and requested that he should experiment with it; that is, it was a sample of some substance which was to be mixed with the ordinary iron developer. His instructions were to prepare a twenty-grain solution of sulphate of iron to thirty ounces of that solution, and add one ounce of the liquid which was in the vial. He tried the experiment to-day. He took a negative, and scratched it down the middle, coated and exposed it.

The negative was then broken in half, and one half was developed by the common iron developer, and the other half by Mr. Lea's developer. That which had the ordinary iron developer upon it flashed up quickly, and developed into a clear pretty negative. It had no defect at all. It was full of detail in the shadows, and was quite good enough to print from. The other came up very slowly, taking a long time to show itself; and after pushing it to the utmost extent that was practicable, a negative was produced of the appearance of an under-exposed negative. Pushing it will result just exactly as Mr. Wenderoth says, in increasing the deposit upon the high lights, without bringing out anything new in the shadows. But this being simply an experiment, he was not able to pass judgment upon the question.*

* Mr. Lea requests us to say that this result appears to be due to Mr. Sellers' having by mistake added double the quantity of restraining

Mr. Graeff: I have made some experiments, Mr. Chairman, which like your own were not sufficient in number to justify the forming of an opinion. My experiments were first with Mr. Lea's developer, and then with the developer made by sulphuric acid and gelatine mixed with a thirty-grain solution of iron and ammonia, which was almost neutralizing, though not entirely so, as it left a little acid. I could not find that there was any material difference between the action of that developer, and that of Mr. Lea's. It flowed very nicely over the plate, and I could leave it on almost as long as I wished, but the trouble in regard to both of them was their slowness, and the time needed to prepare them.

Mr. Wilson said that he had received and would read two communications bearing upon the subject under discussion, the first being from Dr. Thomson, of Douglas Hospital, Washington, who had promised to furnish a paper on the subject for *The Philadelphia Photographer*, and the second being from Mr. Lea at the request of the Society.

He then read the communications at length. They were received with much interest, and will be found in full in this issue. Accompanying the communication of Dr. Thomson were several negatives and prints, which were examined carefully, and with a great deal of pleasure.

The President, on behalf of the Association, expressed the great gratification which he felt on hearing the able papers just read, and said: Gentlemen, you have heard these communications. It seems from Dr. Thomson's account that some benefit is to be derived from this kind of a developer.

Mr. Wenderoth has exhibited some very beautiful negatives, and has shown that a decidedly better effect can be produced than with the ordinary iron developer. But there may be circumstances in which the Lea developer may be peculiarly applicable.

The President also recommended to the members present, or to as many as could do so, the propriety of availing themselves of Mr. Lea's kind offer of the genuine developer. So far as it concerned himself, he was unwilling to base an opinion upon the single experiment which he had made.

Mr. Graeff: It struck me as a probability that amateurs in making the solution might grow impatient for the result, and might not allow sufficient time for the iron to saturate the solution as thoroughly as it should. The work is one of some time. I do not think that even the number of days set down by Mr. Lea would be sufficient. It takes some six or eight days.

Mr. Wilson: On yesterday I received a letter from Mr. Thomas P. Shepard, of Providence, R. I., who has tried this new developer. He speaks of it in the highest terms, and says that the only objection to it he can possibly find is the time required to make it, which he considers to be ten days. Instead of using the iron filings, as suggested by Mr. Lea, he uses fine iron wire cut up into little scraps. I have seen used for reducing old silver residues what are called card teeth. They can be had at the factories where machine cards are made. They are made of pure iron. A great many of them miss the lever in the machine, and are then thrown aside as waste to be melted over, and may be obtained at a very small cost.

The thanks of the Society were tendered to Dr. Thomson and to Mr. Lea for their valuable communications, and it was resolved to continue the subject under discussion to the next meeting.

Mr. Wilson nominated Dr. Thomson as a corresponding member, remarking that the acceptance of such a position by that gentleman would prove a very valuable acquisition to the ranks of the Society.

Mr. Browne: I have a few remarks to make on the subject of Magnesium Light. Much has been said in this city and elsewhere on the subject, but I have so far seen very few suggestions as to the arrangement of the light and its general manipulation, &c. I do not design going into details here, but I would suggest one or two thoughts

agent directed, viz., one ounce, instead of half an ounce, to thirty of iron solution. And that, by adding, more or less, of the restraining agent, the rate of development may be regulated with the utmost nicety; to attain which object, and to obtain greater restraints of preparation, he has latterly been trying methods in which the modified gelatine is prepared first, and the iron solution added separately.

that have arisen in working it. The first is with reference to the fault of the lantern or reflector. Those being made by the American Magnesium Company, and which are for sale, are, I think, inadequate. They are too small. The lantern is also too round at the back, making too much of a central spot, as it were. My idea is, that the lantern ought to be made about twice the size, and ought to flare more. The present lantern is not more than two feet high. I think it ought to be made as high again, so as to diffuse the light to a greater extent. Then there appears to be a great difference in the tapers that are made. The first I used were a much thicker and heavier article than the present, which is half as light again. The first were, I think, infinitely better. I worked them the first, second, and third pictures I took, and in my selections have given them the preference. If the lantern is increased in size, I think it would be a great deal better if the tapers were lengthened. In working this light, I would use two reflectors, charging one two-thirds more than the other with magnesium; the second reflector being used to counteract the heavy shadows produced by the principal light. But care must be taken not to charge them so as to produce a cross light. Of course, that is to be avoided, and I find that the proportion of about two-thirds in the large or principal lantern is the proper amount; in other words, from five to nine grains in the principal light, and a third of that in the other. And one thing I would suggest as a general rule, that the principal light should be nearer the group or object being taken than the second light, which is not so heavily charged.

Dr. Wilcocks: How far is the principal lantern from the subject placed?

Mr. Browne: In a room, for instance, my impression is, that the principal lantern should be six to ten feet, and the other lantern, ten to twelve feet. I think that would be about the proper difference in distance. The magnesium light gives a remarkably artistic, beautiful, soft light. I find, also, in working as an amateur at home, that I can work a great deal better at night with this magnesium light than in the daytime with sunlight. Many persons complain of the intensity of the light. That, of course, is a matter of frequent consideration. I know one or two gentlemen present who have chased green spots up the street, after facing it awhile. I do not think it is a painful light; it is not as straining upon the eyes as the sun, by any means. In order to test the question, I sat for a picture, which I have in my pocket. The lantern was charged with seven tapers, while one was wrapped around the lower part of the others to keep them together at the lower ends. I supposed it would burn twenty seconds, if not twenty-one. I faced the lantern with my head so wedged that I could not move it a particle. The effect was curious. A bright light generally contracts the eyes. In this case, it seemed to enlarge them. [The speaker here exhibited a picture in corroboration of the peculiar effect upon the eyes.]

Mr. Browne suggested certain other modifications of the lantern. He thought it a bad plan to bring the tapers to a point. There would be a difficulty in lighting them otherwise, but the light would be more diffused, especially in the small round lanterns where the light is thrown on one spot. I think it would be better to let them drop down in a row. The other evening I tried how positives could be printed at night, and I found that the least flash of magnesium light was entirely too much. I could not attempt to do anything with it. I placed a very good negative in a printing-frame, and tried three tapers, when I found it gave a very fair print. I have worked with, I think, every artificial light, and to my mind the magnesium light possesses great advantages.

Mr. Graeff: It has occurred to me that the burning of magnesium wire might probably be restrained; that it might be burned with more regularity, and that the dropping of the wire from its vertical position might be avoided by burning it on an iron gauze. I tried an experiment of that kind which, of course, was a very limited one. I found that the combustion was considerably slower. That, of course, would be regulated by the size of the wire, and the amount of air admitted through it. It had also the merit of retaining the light within

a limited space. By altering or decreasing the amount of air, if my views are correct, you could regulate very nicely the rapidity of combustion. In the experiment which I made, the light did not go out until it had burned some ten or twelve inches in that way, and the annoyance produced by the dropping of the wire was also avoided.

Mr. Browne: Any arrangement of that kind to make the light burn more evenly would be, in my opinion, a great advantage.

Mr. Graeff: I desire to ask Mr. Browne whether it would not be better to imitate in the position of this light the light of the skylight, that is, whether it ought not to be higher up.

Mr. Wenderoth: It would be better for the eyes of the sitter.

Mr. Graeff: It would be better for the eyes of the sitter, and I think would produce a more artistic effect.

Mr. Browne: But you must take into consideration that the rays of this light are not the rays of the sun, but a light that gives a reflection; for instance, by putting your light in this position, you will have two or three noses over the face. I have tried the effect of that.

Mr. Wilson: Did you elevate both lights or only one?

Mr. Browne: I have elevated but one light.

Mr. Wilson: In conversation with Mr. Lea, he suggested to me that only the stronger light should be elevated.

Mr. Browne: I tried that. I did not gain much light, only sufficient to relieve the heavy shadows.

Mr. Wilson: Another suggestion he made, and one the value of which we all discovered after the negatives were made for illustrating the January number of *The Philadelphia Photographer*, was, that in grouping the figures we should guard against the shadow of one falling upon the face of another, as otherwise the face of one might be black.

Mr. Wilson also remarked that the American Magnesium Company were at present experimenting with some lamps, and hoped soon to present something that would be very acceptable. Possibly at the next meeting of the Association, that Company would be represented by an agent, for the purpose of exhibiting the lamp, and making experiments therewith. Of this, however, he could not speak positively, but he thought he could effect such an arrangement.

The President called attention to a letter which he had received from a gentleman in the Far West, in reference to the terminating of the Cutting Patent suit, and would be glad to hear what the members knew about it.

Mr. Wilson said that he had written to headquarters for information upon the subject, and hoped to be successful and able to publish it in the next issue of the *Photographer*.

Mr. Wallace presented two copies of engravings made with a six-inch Globe lens, which were much admired and complimented.

On motion, adjourned.

OUR NEW VOLUME.

We are glad to find that our plan of enlarging the *Photographer* meets with such general approval. Our subscribers and friends from all directions have expressed their pleasure, and renewals are coming in daily thick and fast.

Several changes will be found in the new volume, which, we trust, will be received as improvements upon the former ones. We have others yet to make, but have not yet completed our arrangements, and will not announce them until we do. Our patrons may be assured of one thing, however, that no pains shall be spared to make *The Philadelphia Photographer* everything they could desire in a photographic periodical. Do all you can to make it interesting and successful by contributing what you know to its pages, and by spreading its circulation, and we will fully reciprocate.

We will send circulars and pay the postage to any parties if our friends will only send us the names of the photographers they know. Any person sending us five new subscribers and twenty-five dollars, shall receive an extra copy *gratis* for a year. Those who feel unable to remit the whole subscription at once, may remit

semi-annually at the regular rate, which would be $2.50 for six months.

Our pages are larger and contain more matter in each, than any other Journal of Photography in the world, except one foreign one. No other journal regularly publishes photographs, and no other is gotten up in the same handsome style. In our monthly thirty-two pages will be found the most valuable, useful, varied, and new information respecting the art we advocate, that it will be possible to collect in the world.

No photographer or amateur should be without it. We ask a careful inspection of this number, and a careful examination of its contents, and think we can promise that each succeeding issue shall be better than the last. We have secured the co-operation and exclusive publication of the contributions of M. Carey Lea, Esq., and he will contribute to no other journal of photography in this country, which must add greatly to the value of this Journal. The majority of our subscribers seem to favor a monthly issue, which we have decided shall be the case.

Without further remark, we thank our patrons for the renewed and substantial evidence of their approval, and for their many kind letters, and ask others to read our prospectus.

OUR PICTURE.

As promised in our last, the picture in this issue was made by the aid of magnesium light. To most of the readers of this Journal it will be a real novelty, and perhaps some will doubt that such a thing as making pictures after dark by artificial light is possible. We need only remark, we trust, that we were present when the four negatives from which these pictures were printed were made, at the house of our amateur friend, Mr. J. C. Browne, of this city.

The picture is not presented as being in every way perfect, nor do we by any means consider it so.

To print the large number required, we were obliged to make all the haste we could, and having then had but little experience in managing the light, we of course could not meet every difficulty, and had to leave much for future experimenting. We have not yet had the time to make further trials of the light, but hope to do so shortly, and will give a full report in our next.

It will be noticed that these negatives were made in a parlor without any particular arrangement of accessories, thus giving it a naturalness and *home*-like appearance which cannot be attained in the gallery. The gas-light, burning in the chandelier, was made to throw its shadow upon the wall, and blush at being eclipsed by a greater light, helping, however, to make the picture look more like an evening parlor scene. The whole arrangement shows the good taste of Mr. Browne in posing the subjects. The draperies are beautifully displayed, the reflection in the mirror quite natural, and the whole grouping extremely fine.

Having occasion to write to E. George Squier, Esq., editor of Frank Leslie's newspapers, and who, by the way, is an accomplished amateur photographer, and promises to be one of our future contributors, we sent him a print from one of these negatives, and in a late issue of his "Weekly" he makes the following remarks upon the picture:

"The picture is beautiful as such, and might be taken for a careful reduction of some fine painting. The charming graduation of light and shade, the transparent shadows, and general happy effect, really make it a triumph of art in its highest sense. Let this capacity of the photographic art become understood, and it will be appreciated, superseding in great part, if not entirely, our present mode of photographic portraiture. The greatest fortune yet made through photography will be gained by the man who first brings the magnesium light into our parlors, and makes domestic groups at a cost that shall enable families of moderate means to avail themselves of his services."

In another paper in this number we explain some of the defects of the picture, and a way to avoid them. As we said before, they are by no means as good as we hope to make, but they are by far the best we have seen made by the aid of magnesium light.

The prints were made in an incredibly short time by Mr. R. Newell, 724 Arch Street, on albumen paper, manufactured by John R. Clemons, 400 N. Second Street, Philadelphia.

Persons desiring extra copies of this issue may obtain them at the Office, or of any of our agents, as several hundred copies beyond our regular edition have been printed to supply the demand.

Salad for the Photographer.

In introducing the papers under this title, we would remark, that they will be what their title indicates, namely, a mixture of various events and things photographic that may transpire during the month,—a bowl of photographic salad carelessly mixed, which we hope all will be able to partake of, in order to be able the better to digest the more solid matter that may be found in these pages. All good readers are cautioned, however, that it is not expected that they shall partake of this epicurean treat unless they are quite willing to contribute an occasional stray leaf or drop of oil to keep up the supply. No matter how spicy the contribution may be, so it comes in season. This bowl is yours and ours. See to it that each month it brings something worthy of our mental fork and spoon.

Mr. J. O. Beyse, of St. Louis, Mo., has invented a method of coloring and increasing the durability of photographic prints by means of chemical substances, which so combine with the prints when applied to them as to render them indestructible by either water, alcohol, or spirits of turpentine, and are equal in beauty to prints colored by the ordinary methods, and can never fade by exposure to sunlight. The substances used are of such a nature that they can be readily and easily applied by persons unused to such work. Process patented.

The editor of the *News* has been making some interesting experiments with the organico-iron developer, with a variety of results. One of the most curious of them was, that after adding half a drachm of common treacle to an ordinary twenty-grain iron solution without acid, and after prolonged application no image appeared.

Mr. A. Brothers, of Manchester, has made a series of eighteen photographs of the late lunar eclipse. The negatives were made during four hours time, and at intervals of twelve minutes, showing the progress of the eclipse throughout. The telescope used was an equatorial of five inches aperture, and six feet focal length, driven by clock-work. The average exposure was from one to two seconds.

A correspondent of the *News* says, "It is generally considered that enlargements, however good, are not good enough in their original state, but that it is necessary to have them finished by hand before they can be offered to the public as true likenesses and perfect works, and that there is a fortune for any man of moderate abilities who will do that kind of work," viz., touch them up in "black and white chalk."

We suggest that Messrs. Shive & Roettger send over a few specimens made by their solar cameras, and show Old England that we have no cause to complain of the enlargements they make.

The same correspondent tells of a gentleman just commencing photography who, finding a piece of cyanide too large, put it in his mouth and bit it in two! Of course, nothing but very prompt measures saved his life. When will people be wise, and when will chemists learn to label this dangerous chemical, *Poison!*

M. Herman Selle, in the *Cosmos*, publishes a new method of intensifying by the use of a double cyanide of iron and uranium. One solution of ferro-cyanide of potassium is prepared, and another of sulphate of uranium, and the two mixed in equal proportions at the moment they are to be used.

Cosmos also states that M. Julius Schnauss has discovered that an aqueous solution of the soluble parts of dried raisins, deprived of the tartrate of potash therein contained, is a valuable agent in the dry process. The solution is poured over the negatives after sensitizing and before exposure.

Mr. Spiller, of London, has recently turned photography to useful account in exhibiting structures of steel.

The editor of the British *Journal* remarks, that "the more we work with M. Carey Lea's ferro-gelatine developer, the more convinced we are that it, or some modification of it, will shortly supersede all others for the development of collodion plates by the wet process."

Mr. Boynham Jones, writing to the *British Journal*, speaks of the objections to porcelain, rubber, and glass baths, and suggests *papier mache* as a substance well worthy of consideration in the manufacture of baths; he having used several of them some time, and speaks well of them. Will not some of our manufacturers go to work and make them?

D. W. C. perpetrates the following: "Why is the first print from a negative like an undeniable fact?" "Because it's a positive proof."

Another wants to know "Why the mixture of potassium with sulphur does not change the latter?" He says it is "because it is sulphur(y)et."

"Why," says a third, "are weak negatives and modern railroad 'accidents' alike?" "They are both the work of the devil-up-here (developer)."

M. B. de Montfort has discovered a new developer made of "sulphate of copper 5 grammes, dissolved in water 100 grammes. When solution is complete, add 200 grammes of a saturated solution of protosulphate of iron. Next add 5 grammes of nitric acid, and 1500 cubic centimetres of water, and filter the whole."

A new Photographic Society is to be started in Liverpool, to be called the "Liverpool Photographic Society." Each member must be a professional photographer.—*British Journal.*

There has been a great deal of quarrelling and sharp-shooting going on among the correspondents of our different English contemporaries for the past few months, which has been very unpleasant to the reader, and no doubt disgusting to many. We are glad to know that the editors themselves are becoming tired of it, and that such notes by them as "Here the subject *must* drop," and "With the insertion of the above communication we close the controversy in our columns," will probably be effective in quieting down this quarrelsome spirit.

We are sorry that so much petty jealousy exists among photographers here and there that they are unable to get along without quarrelling and calumniating each other. A party of men who are so entirely dependent on light from above for their success, should be able to get along more amicably, and not desire to, and insist upon, using the pages of the Photographic Journals to give vent to their spleen. In another case, one of the English contemporaries seems to have taken upon itself to imprecate the others, and declares itself "the only independent and plain-spoken Photographic Journal in England." We fear such a state of affairs will not permit them to say, "Behold, how good and how pleasant it is for brethren to dwell together in unity."

Mr. Lea's new developer continues to be the subject of a great deal of experimenting abroad, with varied results. Several modifications of it have been suggested, all having for their object the simplification of its manufacture, and the obviating of the necessity of employing iron filings. As the difficulty of obtaining iron filings seems to be an objection to their use, we would suggest that card teeth, such as are used for wool cards, be used. They are of pure iron wire, and may be obtained of James Smith & Co., machine card manufacturers, Northwest corner Marshall and Willow, Philadelphia, at a low figure.

A correspondent in Cedar Creek writes: "Thank Mr. Carey Lea (for me) for his gelatine developer. It is far ahead of anything I have ever tried in the developing line."

Editor's Table.

THE PHOTOGRAPHER FOR 1865.—We shall be able to supply a few copies of our last volume to those who desire them, at subscription price—three dollars. This we shall be able to do, by reprinting two or three of the numbers, which we are willing to do to accommodate those who desire them. Parties having a superfluous January or September number will receive fifty cents each for them by mailing them to this office.

PHOTOGRAPHERS will do well to read the advertisement of Mr. H. J. Lewis respecting his new arrangement for camera-boxes. We will not attempt to discuss the claims of the Southwick (now Ormsbee & Wing) patent, but there seems to be enough in it to allow these men to give you trouble, and it is best to be able to head them off, and avoid litigation. The photographic community are indebted to Mr. Lewis for his efforts in their behalf, and should possess themselves of one of his boxes.

THE PHOTOGRAPHER FOR 1866.—We are glad to announce that cheering letters respecting our coming volume come in from all quarters in great and goodly numbers. All seem to be satisfied, though some would prefer a semi-monthly at a greater price. We think, however, that if it comes too often, a journal is not so well read as when it is less frequent, and we hope we are doing the most good by issuing monthly only.

We would ask parties to read our *club* rates, and also state that we *will take subscriptions for six months* from those who do not care to venture a whole year without first seeing what they are going to get. We hope to give the full value of your money, and ask a careful reading for the present issue, which we will send free to parties applying for it, for two weeks.

ON Saturday, January 6, 1866, Messrs. Ticknor and Fields will begin the publication of a weekly journal entitled "Every Saturday:" a journal of choice reading, selected from foreign current literature. Terms, five dollars per annum.

MATTER LEFT OVER.—We have several valuable papers which we are compelled to lay over for our next. Among these one on Mr. Johnston's Porcelain Picture Process and the Process, one on Mr. Rutherfurd's Moon Picture, and several others. We must ask the indulgence of correspondents who were kind enough to supply so much of interest.

ERRATA.—In Mr. Browne's paper, on a trial of lenses, in our December number, read "Polypell's Island" for "Polyhill's Island."

EXTRA COPIES OF THIS NUMBER.—As there may be many who would like to send the magnesium picture in this number to their friends, we have printed several hundreds over, and can supply any demand. *If any of our subscribers would like it sent to any of their friends who do not subscribe, as a specimen of the Journal, and to show what magnesium light will do, we will send copies free for two weeks, upon receiving a proper list of names and addresses.*

PHOTOGRAPHIC MOSAICS.—Before this reaches you, this little book will be ready for your perusal. With the aid of M. Carey Lea, Esq., we have endeavored to make up a great deal of valuable matter for a small price. Never before were one hundred and forty-four pages of such closely printed matter offered at so low a price as fifty cents. Only the immense sale it will have enables the publishers to do this. It is gotten up in beautifully ornamented style, on nice white paper and same type as this journal. *Five hundred copies were sold before forty-eight pages of the book were printed! Nearly one thousand are now sold.*

By all means have a copy, and place all of your friends in the way of getting it.

NEW WORK ON COLORING.—We shall issue next month a reprint of "Newman's Manual of Coloring as applied to Photographs," edited with a preliminary chapter on Obtaining Harmonious Negatives, and with original notes, by *M. Carey Lea*, together with valuable papers on Lighting and Posing the Sitter. It is hardly necessary to say more in recommendation of this book than to announce its editor. Such a manual seems required, and from the contents proposed, which is before us, we can assure our readers that it will cover the whole ground, and be eminently useful. Newman's Manual alone has reached its fifth thousand in England.

STEREOS.—From Mr. C. A. Palmer, of Newburgh, N. Y., we have a half dozen of most beautiful stereos, of views on the Walkill, Hathaway's Glen, &c. Mr. Palmer expresses his willingness to exchange views with any one, and no one who accepts his offer can feel himself the loser, when he sees these charming specimens, with their rustic bridges, fine trees, and waterfalls.

The Collo-Developer.—Just before going to press, the following expression of opinion was received from Mr. T. P. Shepard, in reference to a specimen of collo-developer with which he had made a few trials—the italics are his own.

"With so limited an experience, I cannot pretend to give a confident opinion of this new form of the organic developer. My impressions are *wholly favorable* in every particular.

"I cannot make it stain or fog, although I have properly tried for both; and I get *light fleecy clouds* with it, with the *foreground fully developed*—a fact that I should have pronounced impossible until I had tried this new form of the developer."

Books Illustrated by Photographs.—No doubt there is a wide field open for photography in the illustration of books. They have a *reality* about them which no engraving, no matter how elegant, can convey. In England, books illustrated in this way are quite common and obtainable at a reasonable price. A few faint attempts at it have been made in this country, but we hope before another holiday season we shall have something really fine. Of the English ones mentioned we have two on our table. The first, "Sheffield and its Neighborhood," by Theophilus Smith, is a history and description of that great city, is printed in beautiful style on tinted paper, and illustrated by sixteen photographs, all made by Mr. Smith, and each one is a gem in itself. The "Hallamshire Forgemen" at their work, "Interior of Room in Carbrook Hall," "Beauchief Abbey and Hall," "Shrewsbury," and "Ribbledene," are among the most beautiful, and give us a variety, embracing architectural, landscape, and interior photography. The view of "Ribbledene," though small, is a charming view, and extremely delicate in detail. Much credit is due the author artist. The other pictures are of "High Street, Sheffield," "Iris Office," old "Hawle at the Poands," "Armor Plate Works," "Ruins of Manor Lodge," "Chimney Piece, Beauchief Hall," "Wolf Wheel," "Stanedge Pole and Rocks," and "Old-timbered House, Norton Leeds," the whole comprising an intellectual and photographic treat, not often to be enjoyed.

"Our English Lakes, Mountains, and Waterfalls," as seen by William Wordsworth, is another work, gotten up in the same beautiful style, illustrated by thirteen photographs of stereoscope size by Thomas Ogle, and a fac-simile of Wordsworth's handwriting. "Rydale Mount," the residence of Wordsworth, "Rydale" and "Derwent Water," "Brougham Castle," "Honister Crag," "Aira Force," and "Wordsworth's Tomb, Grasmere Churchyard," are a few of the most charming of the collection. These, with the accompanying poems by that immortal bard, who has added much to their beauty and interest by his inspired pen, make a pleasant and most beautiful book. Both are published by A. W. Bennett, London, and may be had through any of our leading publishing houses.

Photographs Received.—From Mr. E. A. Kusel, of Oroville, California, we have a packet of cartes, among which are his own picture, a couple of Chinese Sisters, a "Digger" Indian Chief, and a number of other portraits, showing the variety embraced in the population of California. A lady and gentleman printed on one card "neck to neck" is a representation of a new style of making man and woman "one flesh."

From R. Newell, we have a 4-4 print of a New Jersey farm-house, which is very fine, and one of Mr. Newell's best efforts. Accompanying it is a picture of a "crushing" machine, which first plows up the earth, and then cuts up the sod as fine as gravel, dispensing with the plow, harrow, and roller commonly used. It is a curious piece of mechanism, and the photographs of it all that could be desired.

From J. Reid, of Paterson, N. J., Rockwood & Co., of New York, and J. E. Torbert, of Wilmington, Del., we have pictures of the recent eclipse, which are curious, and seem alike successful.

From Sweeny & Tibbits, landscape and mechanical photographers and engravers, Cleveland, Ohio, stereos of the Perry Monument at Cleveland, views on Tinker Creek, the Little Miami, and Little Mountain, Ohio, most of which are very charming and beautiful in the stereoscope.

From Mr. J. W. Black, of Boston, a quantity of beautiful cartes of dear little children, showing great skill in securing shadows of that very important and necessary branch of the community, and also the beautiful effect produced by Mr. Black's monster rolling-press, which works by steam. A series of larger pictures accompanied these, but without titles, so notice of them must be reserved for the present. We do not wonder that a premium was given if such charming pictures as these were shown to the judges of the late Exhibition.

From Prof. Ogden N. Rood, of Columbia College, N. Y., accompanied by his valuable paper on the Solar Spectrum, we have several curious photographs made by him with the microscope, one of the foot of a house-fly, the second of a scale from the wing of a moth, a third of a piece of leucite made by polarized light, and also of the same by ordinary light. Some of them are enlarged several thousand times, and are remarkable wonders of art.

THE

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Proof that Pure Iodide of Silver is always Sensitive to Light.

THERE is a very ingenious theory as to the cause of the sensibility of iodide of silver, which has been of late ably advocated by my friend, Dr. Vogel, and which is very captivating by the simple explanation which it affords of the phenomena of the latent image upon mere chemical principles. This theory may be briefly stated as follows:

1. Pure iodide of silver, isolated, is insensitive to light. It is never sensitive, unless there is some substance present capable of combining with iodine.

2. When nitrate of silver is present in excess, it is capable of taking up the iodine liberated by the action of the sunlight. This free nitrate may be replaced by substances capable of combining with iodine—as, tannin in its various forms, chloride of tin, and many other substances.

There presents itself at once a most formidable objection to this theory: that it assumes a fact, and then reasons on that assumption. It assumes that iodide of silver is, when pure, insensitive, and then explains why certain substances impart to it a sensitiveness. But I deny the original assumption, that pure iodide of silver is insensitive; I affirm that it is sensitive, and offer incontrovertible proofs; and when I examine the argument on the other side, I cannot find that any experimental proof is offered for this alleged insensibility; it seems to be taken for granted, in the face of the clearest facts. If it were said that iodide of silver was moderately sensitive, and that these substances acted as accelerators, the position would be more tenable. But it appears that the positive incapacity of pure iodide of silver to receive a latent image when alone, is the base of this theory, and that it must stand or fall with it.

This alleged insensibility of pure iodide of silver seems in some way to have been received into photography as an admitted fact, and to have been accepted as such, without comment, though endless discussions have been carried on as to why it should be so. Indeed, according to some views, such a thing as pure iodide of silver seems to be hypothetical, and an excess of something or other may always be presumed in it, without test or proof!

I became some time since convinced that this insensibility, generally admitted as it was, had no existence, except on paper, and I made last winter a connected series of experiments to demonstrate the correctness of my views, which experiments were published in May last. They consisted of a series of many experiments, in each of which some new safeguard against error was introduced, until I reached a point which seemed to leave no loophole for reasonable doubt.

The last of this series of experiments I wish to quote briefly here.

Nitrate of silver was dissolved in plain collodion, and a plate was coated with this collodion. This plate was plunged into a bath of aqueous solution of iodide of potassium, and left in it a very long time. So

much nitrate of silver had been dissolved in the collodion, that in the iodide of potassium bath, the iodide of silver formed, burst out from the film, and formed a layer on its surface, holding on to it sufficiently to admit of gentle washing. The plate, then, having been gently but thoroughly washed, was exposed for a few seconds under a negative, and the resulting image was readily developed in the usual manner—the iodide was then sensitive, whilst there was present no substance whatever to which the power of combining with iodine could be attributed.

Now, the fact that this can be done has never been called in question, nor the argument deduced from it, disproved. It appears to be, therefore, reasonable to claim the principle which follows from this series of uncontradicted experiments as an established one, which cannot be passed over, but must either be controverted, or otherwise explained, before any theory inconsistent with it, can be reasonably advocated.

It does not, however, seem to be thought so. Some seem still to believe that iodide of silver may be insensible, and I observe that Mr. G. Wharton Simpson, in an interesting editorial in his journal, on the general subject, seems to hold to the theory above referred to. The general scope of the article referred to is, indeed, the question between the physical theory and the chemical—a question which is only incidentally connected with that with which I am at present occupied, and to which I shall not refer here, but come back to at a future time. The point here is simply, is pure iodide of silver sensitive to light? Or, is it necessary that, as the theory which I am endeavoring to controvert asserts, there must be some foreign substance capable of combining with iodine present, in order to give rise to a sensitiveness in the iodide?

If it were simply alleged that these sensitizers *exalted* the sensibility of the iodide of silver, there could be no argument at all —indeed no fact in photography is more patent than that. But it is not so alleged. It is affirmed that the sensibility to light depends upon the presence of a foreign body of the nature in question, and only exists when that foreign body is there to attract the iodine.

I determined, in the month of August last, to institute some experiments which occurred to me, and which must, as it appeared to me, settle this question finally. I was prevented from making these experiments until the month of October, and had just finished them, but not written them out, when I received the Photographic News of September 8, containing the well-written editorial to which I have above referred.

New Experiments.

In all the experiments which have been hitherto made on iodide of silver prepared in the moist way, it has been prepared either in the presence of excess of silver salt, or of the alkaline iodide, and it was, therefore, easy for those who called in question the results argued from the experiment, to assert that the silver salt or the potassium salt, as the case might be, remained in an excess which could not be removed by washing. This is a sort of theory that no one has a right to assert without analytical proof, which latter was not forthcoming, although it is certainly he who asserts the presence of an impurity, who is called on to prove that it is there.

My experiments of last spring disposed, I think, of this view, but I now determined to adopt a course which would put any such assumption out of the question, and also to have no foreign body whatever present. I accomplished this in the following manner:

On some plates of clean glass, I produced clear, bright specular films of metallic silver in the same manner as is used for silvering glasses for optical purposes, viz., by the action of Rochelle salt on ammoniacal nitrate of silver. These films are dense and metallic, set themselves in absolute optical contact with the glass, and adhere well enough to permit of thorough washing under a steady rapid stream of water. They were all so washed for at least an hour each.

We have here, then, nothing but glass and pure metallic silver. No possible suspicion of an impurity, organic or inorganic.

These plates were then cut up into pieces of a convenient size, and were plunged into a solution of iodine in weak alcohol. They almost instantly blackened, and then gradually passed to the yellow color which in-

dicates complete iodization. It is rather remarkable that whilst two or three seconds were sufficient for the blackening by formation of subiodide, half an hour or thereabouts was requisite for the complete conversion into neutral iodide, so long does it take for the action of the iodine to penetrate the film.

In order to insure that not a trace of metallic silver should be left, the immersion of the plates was prolonged for an hour and more. The transparency of the glass rendered it easy to observe, if the film was iodized all the way through. The change, from the brilliant dark specular surface of the metallic silver to the light yellow granular film of iodide, is too striking and conspicuous for any one to be left in doubt on this point, and even were it not, it is impossible to suppose that a thin film of metallic silver could be for an hour in a solution of iodine, without being completely iodized thereby.

In fact, the silver film, by its conversion into iodide, lost its adhesion to the glass, and the manipulations became to the last degree delicate and difficult. The films got loose, broke up, and slid about on the surface of the glass to that extent that it seemed almost impossible to carry out the experiment. By care and patience, the pieces of glass were got out of the iodine solution with enough of the film remaining attached to work with. By slipping these cautiously into a basin of water, constantly renewed by a gentle stream, they were washed slowly, but thoroughly. By further management, the plates were got out of the water, and finally dried. About two-thirds of the film was in this way lost, but a sufficient number of good, smooth, uniform pieces were obtained to continue the work with.

These pieces were exposed under a strong negative for a few seconds to diffused light. They were then carried back to the dark-room, covered with solution of pyrogallic acid, nitrate of silver, and citric acid. Here, again, the utmost difficulty was found in preventing the films from breaking up the moment they were moistened. With care, however, the solution was got over them, and bright, sharp and clearly defined images were developed.

This demonstration, I am inclined to think, will be found unanswerable. Where a collodion film, or paper, is made the vehicle, there is always at hand the easy and ready objection of "organic matter." Again, in the case of the daguerreotype, there is the metal back. It can be alleged (and has been so stated by Mr. Hunt, and may quite likely be true) that the metallic silver behind the iodide acts as "sensitizer," by taking up the iodine eliminated, or if the iodizing has penetrated through the whole thickness of the silver plating, there is still the copper back conveniently ready for the iodine.

But, in my experiment, nothing of this sort can be alleged—there is iodide of silver loose, inconveniently loose, upon a glass plate, nothing organic, nothing metallic, nothing capable of taking up iodine, nothing upon which the most argumentative of reasoners can hang an hypothesis. And the iodide is sensitive, unmistakably so. Where iodide of silver is exposed to light in tubes, and then a developer applied in a dark-room, there may be questions of differences of shades, and whether the powder is a little darker.

But when one has developed, as I have, an image of engraved lettering, and has read the letters and words bright, clear, and sharp, upon the iodide film, he does not, and cannot, entertain the least doubt, as to whether the iodide was sensitive or not.

Influence of Alkaline Iodide.

One of the views that has been persistently urged in theoretical photography, is that,

1. Iodide of silver formed in presence of an excess of alkaline iodide, attaches to itself an excess of the iodide, which renders it insensible.

2. This excess of iodide cannot be removed by any washing.

I have never been able to hear of any satisfactory experiments in behalf of this latter point, but have always regarded it as an unsupported hypothesis, made to explain supposed facts which themselves had as little existence as the supposition resorted to, to explain them.

Experiments which I published last

spring seemed to me to dispose of this matter finally, but some new examinations lately made, will put the matter in a still clearer light. First, I wish to cite one of the experiments above referred to.

A piece of paper was imbued in nitrate of silver, dried, and then steeped in a solution of iodide of potassium. It was then simply blotted off with blotting-paper. In this state, whilst still moist, and of course having present an abundant excess of iodide of potassium, it was exposed to light under a negative, and proved, as was of course fully expected, perfectly insensitive to development. But another piece of the same paper, instead of being simply blotted off, was thrown into water, and well washed under a tap. Then, being exposed as in the previous case, an image was readily developed on it. Here was proof positive:

1. That the presence of an excess of iodide of potassium renders iodide of silver insensitive, a fact which has never been denied.

2. That, by simple washing, the paper recovered its sensitiveness.

3. That it follows that any excess of alkaline iodide which may be present, is not combined with the iodide of silver, but may be easily washed out.

This appears clear, plain, and unanswerable. But as the contrary opinion does not seem to have been wholly abandoned, it occurred to me that the course of experiment described in the foregoing part of this paper, might adapt itself to a beautiful verification of the ideas which I have been maintaining.

I therefore proceeded as follows:

Pieces of the silvered glass were plunged into a solution of iodine to which a notable quantity of iodide of potassium had been added. Here then was iodide of silver formed in presence of iodide of potassium, and in entire absence of any other substance whatever, upon which a disturbing agency could be charged. No experiment could be clearer, no conditions more sharply defined.

The films of iodide, after having been submitted to a very lengthened exposure to the liquid, were taken out and washed. As in the previous experiments, the most delicate and careful manipulation was required to keep these films in existence at all, through the various treatments to which they were subjected, but with attention and patience, this was always accomplished. The films broke, and parts would wash away, but enough was always preserved to render the experiments decisive.

After these plates had been thoroughly washed and dried, the following trials were made:

1. A film was exposed under a strong negative to a diffused light for seven seconds. It developed with pyro, citric acid and silver without difficulty, giving a bright, clear image.

2. A similar piece was exposed under same negative for two seconds to a strong diffused light, almost amounting to a faint sunlight. Developed, as before, with a similar result.

There were no failures, nor unsuccessful trials, no coaxing, nor effort necessary. The images, in each case, came out in a very few seconds, and were bright and distinct. As in the previous experiment, a negative of engraved work and lettering was selected, because such images offer clear, sharp contrasts of white and black that admit of no doubt as to their presence—they are either there clear and bright, or else wanting altogether.

I think I may now, without presumption, claim that these experiments settle the question as to the sensitiveness of pure iodide of silver. It is a point of view in which I have stood almost alone, the entire weight of opinion having been against me. But the results above described seem too decisive to be rejected, and if they are accepted, some of the favorite theories of the day must be materially modified.

M. Carey Lea.

Philadelphia, October 4, 1865.

RUTHERFURD'S PHOTOGRAPH OF THE MOON.

Those who read the news of the day have doubtless read frequently of the large photograph of the moon taken by Lewis M. Rutherfurd, Esq., of New York. It has been our pleasure to receive a copy of the same from Mr. Oscar G. Mason, 599 Broad-

way, New York, who is agent for the sale of them.

While looking at it, we are filled with mingled wonder, and awe, and admiration. With wonder at this grand leap of photography far up into the heavens, with awe at the mysteries of that wonderful planet, and with admiration at the great success of the undertaking. The attempts of De La Rue, Bierstadt Bros., and others have all been successful, but in no ways as successful as Mr. Rutherfurd.

In a paper contributed to the American Journal of Science by him, Mr. Rutherfurd gives a full explanation of his mode, and the difficulties of making such a picture, and we extract portions of it, as our readers will doubtless feel interested in this truly great achievement.

"My present observatory is a circular brick building of twenty feet internal diameter, with a light revolving roof supported on twelve wheels which are fixed to the stone coping of the walls.

"The opening, two feet wide, extends from side to side with simple shutters, which, when elevated on the weather side, serve to prevent the wind from blowing into the observatory, and shaking the telescope. Opening from the west side of the equatorial dome is a small transit apartment with computing room attached. This observatory is in the garden of the house where I reside. The transit is 189 feet northwest from the Second Avenue, and 763 feet northwest from Eleventh Street. It was erected in the summer and autumn of the year 1856. The equatorial, by Fitz, is a very substantial instrument, having circles divided on silver 18 and 20 inches in diameter.

"The objective is of $11\frac{1}{4}$ inches aperture, and fourteen feet focal length, and was corrected for figure by myself after the methods and directions of Mr. Fitz. It is a fine glass, capable of showing any object which should be seen by a well-corrected objective of those dimensions.

"During the winter of 1857–58, Messrs. Alvan Clark & Sons constructed, and in the spring attached to the equatorial, a driving clock of the highest merit. It has a remontoir escapement similar to that of Bond's spring governor.

"Having seen with great interest the photographic experiments conducted at the observatory of Harvard College, I determined, as soon as the clock should be in working order, to prosecute the subject of celestial photography. After many experiments it was ascertained that the best photographic focus of the objective was about seven-tenths of an inch outside of the visual focus. I continued making photographs of the moon and such stars as could be obtained, and although when compared with what had been done by others the results gave reason for satisfaction, yet in view of what was desirable and apparently attainable, astronomical photography with me was a failure. By reducing the aperture of the telescope to five inches for the full moon, I was enabled to produce negatives which would bear an enlargement to five inches or fifty diameters. An impression of a sixth magnitude star was never obtained, γ Virginis, then $3''$ distant, was the closest pair the duplicity of which could be measured on the collodion plate. The ring of Saturn and the belts of Jupiter were plainly visible, but entirely unsatisfactory. An image of Jupiter could be obtained in from five to ten seconds' exposure, but the satellites failed to impress the plate in any length of time. This was due to the uncorrected condition of the objective, which diffused the violet rays over a large space, so that in the case of the planet each point of the picture was influenced not only by the ray due to that point, but by the stray beams from adjoining portions of the object, and thus nearly the whole actinic force of the objective was gathered within the dimensions of the image. In the case of the satellite the lost rays were not replaced by the wanderers from any adjacent point.

"During the summer of 1858 I combined my first stereograph of the moon, producing quite a satisfactory result with the low power of the stereoscope. I do not know when this was first done in England by Mr. De La Rue, but with me the idea was an original one.

"During the year 1859, and for a long time I worked with combinations of lenses to be inserted in the tube between the objective and the plate with the view of cor-

recting the photographic ray. This attempt succeeded well so far as the centre of the field was concerned, but it was impossible to produce a good correction over a space equal to the area of the image of the moon, without using a corrector of inconvenient size.

"In 1860 I prepared a telescope with camera and instantaneous apparatus mounted equatorially, to send by the U. S. Coast Survey Expedition to Labrador for the observation of the eclipse. The objective in this case was a fine one, by Alvan Clark, of $4\frac{1}{4}$ inches aperture. A ring was placed between the crown and flint lenses of such a width that the best visual and photographic foci were united. For this purpose it was necessary to shorten the combined focus about one-twentieth of its former value.

"The pictures of the sun taken with this instrument were better than those made by my large telescope, in which no attempt had been made to correct the photographic rays.

"Being unable to accompany the expedition, I made a series of pictures of the eclipse at home, upon which are seen the nuclei and penumbræ of the spots, the gradation of light of the sun's disk, and the serrated edge of the moon projected upon the sun. They show, however, none of the fogging of the moon's surface, commented upon by other observers, nor a greater intensity of light at the points of contact between the sun and the moon; both these results are, when they occur, due, in my opinion, to photographic or optical causes, and not to any true astronomical phenomena of that nature.

"On examining the first negative of the eclipse, I was struck by the difference of sharpness between the edge of the sun and that of the moon projected upon its disk. At first I was inclined to think that it was caused by a falling off in definition near the edge of the eye-piece used. In the next picture the edge of the sun was placed near the centre of the field, and the moon removed to a remote part of the plate, yet still the result was the same; the sun's edge was soft and indefinite, while that of the moon was hard and sharp, showing that the light from the two objects comes to us under different conditions; in one case traversing the sun's atmosphere, in the other unaffected by this disturbing cause.

"In the autumn of 1861, I began to experiment with a reflecting telescope with silvered mirror, which recommended itself both by the simplicity and ease of its construction and the entire freedom from dispersion. One was mounted of thirteen inches aperture and eight feet focus, of the Cassegranean form. It was ground and approximately figured by Mr. Fitz, and in its frame, as strapped to my large tube, and carried by the equatorial clock, weighed less than fifteen pounds. Many modes were tried of silvering, but the best results were obtained by Liebig's process, wherein the silver is deposited from an ammonio-nitrate solution by sugar of milk. After three months' trial I abandoned this instrument as unfit for use in my observatory. First, the tremors of the city, quite imperceptible in the achromatic, were, by the double reflection, increased about thirty-six times, an insurmountable obstacle to good work. Secondly, the silver deposit is so easily attacked, both by moisture and the gases which abound in the city, as to make it necessary to resilver the speculum at least every ten days, a labor not to be contemplated with equanimity. Dr. Draper has found the silver surface very much more durable in the dry, pure air of the country. I regard the Cassegranean form as the best adapted to lunar photography, since the dimensions of the image can be varied at will, as circumstances dictate, by simply changing the small mirror, a number of which might be kept at hand.

"Having thus failed in astronomical photography with an ordinary achromatic, with a correcting lens, and with a reflector, I began, in the autumn of 1863, the construction of an objective, to be corrected solely with reference to the photographic rays.

"Having obtained the achromatic correction, I had a most delicate task to produce the correction for figure, since the judgment of the eye was useless unless entirely protected from the influence of all but the actinic rays. A cell of glass inclosing a sufficient thickness of the cupro-sulphate of ammonia, held between the eye and the eye-piece, enabled me to work for coarse

corrections upon α Lyræ and Sirius, but so darkened the expanded disk of a star in and out of focus that all the final corrections were made upon tests by photography, which gave permanent record of all the irregularities of surface to be combated. Still, however, the process was long and tedious, dependent upon but three stars as tests, and they too often obscured by bad weather. My mode of correction was almost entirely of a local nature, such as practised by the late Mr. Fitz and Mr. Clark for many years.

"This objective was completed about the first of December last; it has the same aperture, 11¼ inches, as the achromatic, with a few inches shorter focal length, and can be substituted for it in the tube with great ease. The corrections of this objective are such that I think it capable of picturing any object as seen, provided there be sufficient light and no atmospheric obstacles.

"The great obstacle which prevents the results of photography from realizing the achievements of vision, is atmospheric disturbance. In looking at an object, the impression is formed from the revelations of the best moments, and it is often the case that the eye can clearly detect the duplicity of a star, although the whole object is dancing and oscillating over a space greater than its distance. The photograph possesses no such power of accommodation, and the image is a mean of all the conditions during exposure. It is, therefore, only on rare nights in our climate that the picture will approach the revelations of the eye.

"Since the completion of the photographic objective, but one night has occurred (the 6th of March), with a fine atmosphere, and on that occasion the instrument was occupied with the moon; so that as yet I have not tested its powers upon the close double stars, 2″ being the nearest pair it has been tried upon. This distance is quite manageable, provided the stars are of nearly equal magnitude. The power to obtain images of the ninth magnitude stars with so moderate an aperture promises to develop and increase the application of photography to the mapping of the sidereal heavens, and in some measure to realize the hopes which have so long been deferred and disappointed.

"It would not be difficult to arrange a camera-box, capable of exposing a surface sufficient to obtain a map of two degrees square, and with instruments of large aperture we may hope to reach much smaller stars than I have yet taken. There is also every probability that the chemistry of photography will be very much improved, and more sensitive methods devised.

"On the 6th of March, the negatives of the moon were remarkably fine, being superior in sharpness to any I have yet seen. The exposure for that phase, three days after the first quarter, is from two to three seconds, and for the full moon about one-quarter of a second.

"The success of this telescopic objective has encouraged me to hope that an almost equal improvement may be made for photography in the microscope, which instrument is more favorably situated for definition than the telescope, since it is independent of atmospheric conditions. Its achromatic status is easily examined by the spectroscope, using as a star the solar image reflected from a minute globule of mercury. Mr. Wales is now constructing for me a one-tenth objective, which, upon his new plan, is to be provided with a tube so arranged as to admit of the removal of the rear combination, and, in place of the one ordinarily used, one is to be substituted at will, which shall bring to one focus the actinic rays."

In addition to this, we learn in a letter from Mr. Rutherfurd, that in this case the original negative was 1.5-in. diameter from which a positive of the same size was made in the camera. From the large negative it was thrown up with a 3-in. Harrison Globe lens, using sunlight thrown by a heliostat of domestic construction through a triple achromatic condenser constructed for the purpose. Those who are interested should by all means secure a copy of this grand picture.

Johnston's Process for Making Porcelain Pictures.

It will be remembered that in a recent issue of this Journal there appeared in the advertising pages a notice of a formula for making porcelain pictures, by Mr. Henry M. Johnston, of New York, and indorsed by the responsible house of Messrs. E. & H. T. Anthony & Co., who acted as his agents. Mr. Johnston, believing he had discovered a good process, offered to sell it to one hundred photographers who might be willing to pay him twenty-five dollars each. Quite a number at once availed themselves of the opportunity, and of course as part of the agreement when receiving the process promised secrecy. By some means, however (it is not for us to say whether fair or foul), to the surprise of Mr. Johnston and all interested, his process appeared in print, with sundry remarks by the publisher of the Journal in which it appeared not very complimentary to the process or to the author. Having thus been deprived of his rightful property, Mr. Johnston at once ceased to sell it, and requests that we give the readers of this Journal the benefit of it, and print it in full. This we could have done three months earlier, but did not feel that it would be right or honest to do so, or that our readers would have any right to receive it in any other way than direct from Mr. Johnston. He has sent it to us, requesting us to publish it. As usual with other processes, his begins with

Cleaning the Glass.

This part of the process, in combination with the after-operation of coating the plate with albumen, requires great cleanliness. If the plates are new, they will only require soaking for a few hours in a solution of one part nitric acid to three of water. But if the plates have pictures on them, they should be soaked in a concentrated solution of potash and water. Let the plates remain in this solution until the film can be entirely removed by a tuft of cotton flannel tied on to the end of a stick; after which wash the plates well, and leave them in the acid for a few hours. Then wash well to remove the last traces of acid, and stand up to dry.

Coating the Plate with Albumen.

Put 2 ounces of albumen and 6 ounces of water in a 16-ounce bottle; shake well for about fifteen minutes. Let the solution settle and filter perfectly clear, through filtering paper which has been previously wet. When about to coat the plate, wet the surface with water, drain it, and then pour on the albumen. It should present a surface perfectly smooth and free from projecting particles. If this does not appear from the first flowing, flow it again with the albumen until it presents such an appearance, then stand up on blotting-paper to dry. When the plate is perfectly dry, if it presents any streaks or markings, the operation has been imperfectly performed. Therefore the plate should be moistened with a little of the potash solution, and rubbed over to remove the albumen, and again coated as before. When the operation is properly performed, the plate will appear as though nothing were upon it.

Sensitizing the Plate.

Flow the plate, and coat it in the same manner as any other plate. When it is fully coated and free from streaks, remove it from the silver bath, and wash it well for about a minute under a stream of running water; then immerse it for a quarter of a minute in the salt solution, and wash again for half a minute; then pour on some of the preservative solution, and flow it backward and forward for a quarter of a minute; drain well and stand it away to dry in a perfectly dark box.

This operation should be performed in yellow light. When about to make a picture, place the dry plate in contact with the negative in an ordinary pressure-frame. Expose to diffused light for about three seconds, more or less, as the case may require, according to the intensity of the negative and strength of light. Then take the plate to the dark-room, remove it from the pressure-frame, and wash for a few seconds under a stream of water, and develop it. Take about a half oz. of No. 1 solution, and flow over the plate, in same manner as collodion, and drain it back again into the developing glass, and add to it about a quarter of a drachm of No. 2 solution; pour this on the plate and back in the developing glass a number of times, until the image is fully

developed. The picture should be developed a little darker than it is intended to remain, as the fixing solution cuts it out a little. When perfectly fixed, wash for about three minutes, and place in the rack to dry. If it does not then present a pleasing tone, it may be toned to any extent with the toning solution; after which wash well and dry. The picture now possesses a very good surface for coloring; but it may be slightly improved by flowing the plate with the coloring solution. Stand on end to dry, so it will not attract dust.

FORMULÆ.

Collodion.

Alcohol,	8 ounces.
Ether,	8 "
Iodide of ammonium,	40 grains.
Iodide of cadmium,	40 "
Bromide of potassium,	32 "
Soluble cotton,	80 "

More or less as the case may require to give the collodion the proper flowing consistency.

Dissolve the iodides in the alcohol and ether; then dissolve the bromide of potassium in a minimum quantity of water, and add it to the alcohol and ether; filter out the precipitate, and then add the cotton and enough tincture of iodine to give the collodion a positive wine color.

Silver Bath.

Water,	64 ounces.
Nitrate of silver,	7½ "

Dissolve the silver in two-thirds of the water, and add a solution of iodide of potassium, dissolved in water, enough to give a precipitate which will not dissolve in about five minutes. Then add the other kind of the water, and filter perfectly clear. Acidulate with two drachms of pure glacial acetic acid. Then try the bath, as it should give clear, brilliant effects on ordinary glass, by the camera.

Salt Solution.

Water,	1 quart.
Salt,	160 grains.

Preservative Solution.

Water,	8 ounces.
Gallic acid,	8 grains.
Citric acid,	8 "

This solution and No. 1 of the developing solution should be mixed fresh every time they are to be used, as they will lose their properties by standing about a day.

Developing Solutions.—No. 1.

Water,	4 ounces.
Pyrogallic acid,	6 grains.
Citric acid,	6 "

No. 2.

Water,	1 ounce.
Nitrate of silver,	20 grains.
Citric acid,	40 "

This solution may be kept and used until the precipitate begins to fall, when it is better to mix more fresh solution.

Toning Bath.

Dissolve 45 grains hyposulphate of soda in 32 ounces of water; then dissolve 15 grains chloride of gold in 16 ounces of water, and add it, little by little, to the hyposulphate solution. Shake well, and when the mixture becomes clear as water, it is then fit for toning. Pour about an ounce of this solution in a small bottle repeatedly, until the desired tone is attained. After using, reject the solution, as it does not tone well a second time.

Coloring Solution.

Alcohol,	8 ounces.
Gum camphor,	2 grains.
Bleached shellac, pulverized,	24 "

Place the ingredients in a bottle, and set in a warm place, shaking it occasionally, for about a day. Filter through paper, and it is ready for use. It is necessary to state that all the solutions should be filtered clear, and kept free from suspended particles.

Fixing Solution.

Hyposulphate of soda,	1 pound.
Water,	24 ounces.

In order to obtain sharp pictures on uneven glass, I use an extension box or tube placed in front of the printing-frame, the length of which should be about three feet and tapering towards the end, so as to admit of an aperture large enough to receive a quarter-plate tube. By placing the tube towards the heavens, and receiving the light from it on the negative, a sharp picture can be made on glass which would otherwise be useless.

THE COLLO-DEVELOPER.*

I DID not understand until within a day or two that the Photographic Society desired to have a few remarks from me on the subject of the Collo-developer. And on looking yesterday over a short article on the subject which I had written for the December number of *The Photographer*, just published, it seemed to me that it expressed very nearly all that I had to say on the subject.

From experiments made since that paper was written, I am confirmed in the belief that I have always entertained, that the substance which in this developer exercised so remarkable an influence upon the development, is not in any way the gelatine, but the products of the decomposition of the gelatine by the sulphuric acid. And I am inclined to believe that there are two different agencies at work; two different substances which influence the development: one of these the *restraining* substance, and the other that which affects the *color* of the negative. For I find that in different modes of preparation, although there is the same general result, there will be this difference, that some forms of the developer give darker negatives and less restraining power; others, negatives less darkened in tint, whilst the restraining power is greater, and the development slower.

I believe it will be found that the activity of this developer depends upon the formation of certain definite crystallizable compounds produced during the reaction of the sulphuric acid on the gelatine. I have recently observed the formation of long transparent colorless prismatic crystals in one of my solutions which had been allowed to evaporate spontaneously. And in another, differently prepared, I obtained large rhombic crystals, also transparent and colorless. These I have as yet had no time to examine, or even to remove from the vessels in which they formed. But I believe them to be distinct from any substance described in our text-books.

It is a characteristic of this developer that when a plate has been somewhat under-exposed, the developer may be left on it to finish its work quietly and safely. If the under-exposure has been considerable, the plate may be balanced on a levelling-stand, or on the cork of a wide-mouthed bottle, and the developer be left on it, with or without the addition of silver solution as the case may indicate, whilst the operator finishes another negative. Then the first may be taken up again and completed; all this without hurry or anxiety, and without the least apprehension of fogging.

As a general thing, no alcohol is required with this developer to make it flow smoothly over the plate. Only with an old bath, full of alcohol and ether, it may be required. Generally, however, when a bath does not take this developer smoothly without alcohol, it will have reached a point of general foulness which will require it to be remade on other grounds. So that the exemption from the use of alcohol, now so expensive, is pretty nearly complete.

Mr. Shepard, of Providence, R. I., writes me that in using this developer for landscape negatives, he has remarked that the development seems to represent the successive stages of exposure. That the clouds, for example, come out distinctly at first, even when in the finished plate the skies may be too dense to show them. And he suggests that, by a regulated local development, skies might be always preserved with the natural clouds at the same time that the rest of the plate received a full development.

There is in fact about this developer a peculiar plasticity, so to speak. It is peculiarly manageable—so much under control that the operator increases its action, checks it, or stops it altogether at will. It can be made to work as fast as a common iron developer, and yet perfectly free from fogging. Or from this, to any degree of slowness that is desired. The facility of redevelopment by simply adding silver solution, dispenses with pyrogallic acid, which may thus be entirely dismissed from the photographer's laboratory.

Abroad, where this developer has become very popular, there has been a disposition to claim a certain amount of originality under color of slight modifications. In point

* Read before the Philadelphia Photographic Society, December 6th, 1865, and crowded out of our last issue.

of principle, it matters but little whether the gelatine and acid be directly saturated with iron, or whether it be first saturated with ammonia or other base, and then sulphate of iron added. The cardinal principle consists in the addition to the developer of the products of the action of sulphuric acid upon gelatine, however this may be accomplished.

I shall have pleasure at any time in giving specimens of this developer to any members present who may desire to experiment with it, and may not have leisure or opportunity to make it for themselves.

Allow me, in concluding these brief remarks, to express my very great regret that my confirmed ill-health deprives me of the pleasure and advantage of participating in the meetings of this Society, which I should otherwise take so much interest in doing.

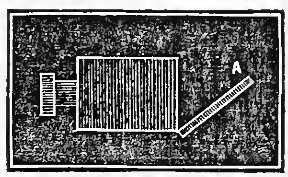
M. Carey Lea.

December 5, 1865.

To Reverse the Image on the Ground Glass.

The advantages of a reversed image on the ground glass for focussing, or to speak paradoxically, one that is *not* reversed, are very evident. Many have tried and no doubt have accomplished it, but the following plan, suggested by Mr. William A. Brice, of Ceylon, correspondent of the British Journal of Photography, is both novel, useful, and effective. He writes, "For several days I tried to reverse the image on the ground glass in every possible way by various combinations of lenses, &c., but all to no purpose; at last I remembered having been once told that it required nine lenses to reverse an image, so I gave up the lens trying, and made a prism with three stereoscopic plates, and put this huge prism in front of my screen. Eureka! I had found it. My image was reversed and tolerably distinct but not quite. So, thought I, a piece of looking-glass put under my prism will reflect the image brighter, and so it was; but happening to glance over the edge of my prism direct on to the looking-glass, judge of my surprise and joy on seeing the image in its reversed position—that is to say, as I wanted it to appear direct on the looking-glass—and so clear that I could focus accurately from it, instead of from the screen. The 'murder was out,' the difficulty was no more, and my trouble was at an end.

"Now, in order that you may prove for yourself what I state, here is a diagram, and you will acknowledge that it is quite a different sort of pleasure, focussing a picture upside down or right side up. Now, I have seen no previous mention of this simple 'dodge' except a description, some three or four volumes back, of a rather complicated *reversing camera*. My plan, if I may be allowed to call it so, is applicable to any camera, large or small, without other apparatus whatever, save and except the ordinary camera, lens, focussing screen, focussing cloth, and a piece of common looking-glass. I am thinking of taking out a patent for this process, and thereby prevent people of all ranks and ages, aye, sexes, from ever viewing themselves in a looking-glass again. Would not there be a nice uproar? But if you have a mind to try the experiment, focus your picture on the screen first, and then, holding a looking-glass at an angle of 45° or so, and looking over the top of the looking-glass into it, you will see the picture accurately reflected and in its right position, thus:



"Of course, the glass might be made either to hinge, or it might be a fixture. I now invariably focus in that way, or at least examine my subject in that manner. I should be glad to have your private opinion on that practice, as it has never, so far as I know, been mentioned before in any of the journals, and I have read every page of them; though I expect to find that this 'dodge' is known to, and practised by, thousands, who have wisely, however, kept it to themselves, instead of throwing it recklessly at your heads as I have done."

If our readers will try this plan, they will find it very successful, and a great advantage to them. If any of them know of a better plan, we should be glad to publish it.

Ed. P. P.

IRREGULAR SPOTS ON THE COLLODION FILM.

Having read a good deal in several American and German Journals of Photography, on the cause of the production and avoiding of irregular white spots on a sensitized collodion film after keeping the same a short time, before exposing and developing, I have noticed a great deal of speculation as to how that nuisance is produced, and how it can be best avoided; but I will give you my experience, and if it should be of any advantage to the fraternity, you may make use of it in any way you please.

Some two years ago, I, like many others, was troubled with white spots and streaks on the films, after removing the same from the bath a short time, and so I set myself to work to overcome that difficulty, in which I succeeded to my satisfaction, and from that time, knowing the cause, I have had very little or no trouble in doing away with streaks if they appear; now I will give you the causes.

First cause: the collodion must be ripe, to give a short and somewhat rotten film, and better not to be iodized with the potassium salts, and in no way must the collodion be *over-iodized.* The reason is *obvious*, because a hard and horny film will always have, like an over-iodized collodion, the sensitive part of the film or picture on the top, and can easily be brushed off, when dry. This state of the film will also cause a shrinking of the collodion, and therefore will leave an uneven film on the plate, from which the excess of silver cannot evenly run down, and therefore producing these irregular spots on drying, which could not happen so easily on a soft film, which would and does hold moisture enough to keep the nitrate of silver on the film from crystallization for some time. I have also noticed that the potassium salts are very prone to quick drying and crystallizing, and in leaving a scummy mixture on the drying film; therefore, if the collodion is too tough, add old rotten collodion, and if over-iodized, add plain old collodion, and never iodize your collodion with *potassium, iodide*, or *bromides*, in such cases.

The second trouble is the bath, which may be the cause of the spots, and I have also noticed that a strong bath, which contains more than from 43 to 45 grains of silver to the ounce of water, is very apt to give spots, and in particular, if the plates are taken out of the solution before the film is perfectly formed; therefore try your bath. If too strong, take water, and reduce it to 43 grains of silver; but better still, add about eight ounces of water more, and then put into the bath of about eighty ounces of solution, thirty grains of cyanuret of potassium, and boil it down eight ounces: set the same in bright sunlight for a few days; after which filter, and if it soils the pictures, drop in a little pure nitric acid, until the pictures are clear. Never use a stronger bath than forty-three grains to the ounce of water; never take your plate out of the nitrate solution before the iodide and bromide of silver are perfectly formed, and you will have no trouble, even in a temperature like ours, which runs from 80° to 110° Fahrenheit in the summer. The idea of putting a moist rag on the back of the plate, and moistening the slide of the plateholder, is a very good one, and ought not to be omitted, if travelling a great way, and in taking children's pictures in the hot summer months.

I wish you to be so kind as to forward to me the February number of *The Photographer;* in the first lot you sent me the February number was missing, and I wish to complete my file to get them bound. I think, of all journals I get, yours is one of the most interesting and instructive, but I think you ought to give more pictures of persons and groups, showing the artistic positions and grouping of one or more persons. This is too much neglected; the only Journal which writes about that matter is the Photographisches Archiv, but it gives no photographs. Dealing with a lot of stubborn men and women and smirking children is much more difficult than to draw

and paint the same, and arrange them all after your imagination on paper, &c.

I send you, inclosed, a few of my small productions, and would like to have your opinion of them. They are silvered with thirty grains of silver, and fifteen of nitrate of ammonia, and after being well dried I fume the paper on a strong solution of con. ammonia, about two minutes, print, wash in clean water, and then in salt water, and then tone in gold and lime, wash well again and fix in hyposulphite of soda. I also am able to give a developer which, I think, is original, and which I in general use for taking children's pictures; it works well, and will bring out the picture, if no other will do so.

Sul. quinine, ...	20 grains.
Sul. of iron, ...	½ ounce.
Water, ...	8 "

Dissolve the quinine in as little sulphuric acid as possible. Dissolve the iron in the water, and filter into the dissolved quinine; if a few days old, it is better. No alcohol is needed, and works very even, and gives good intensity and details.

E. A. KUSEL.

OROVILLE, CAL.

BLISTERING OF ALBUMEN PRINTS.

BY M. CAREY LEA.

A RECENT number of the British Journal contains an interesting editorial article upon this subject, in which the conclusion arrived at is, that the trouble in question is attributable to the different diffusibility of different liquids through membranous tissues, so that the pure water forces itself through the albumen film more rapidly inwards, than the hyposulphite solution does outwards, the result of which is that the quantity of liquid between the paper and the film continues to increase until the elasticity of the albumen controls its further expansion.

This explanation seems both ingenious and reasonable. It has suggested to me a remedy, which is far less troublesome than that proposed in the article referred to, and which is not perhaps too much so for practical use, should it be found to be effectual.

The blistering takes place only when the prints are removed from the fixing bath, and thrown into the washing water. Suppose it be found that the first of a lot show symptoms of blistering—then let the experiment be tried of *floating* others at first for a few minutes on water, *face upwards*, either by simply allowing them to rest on the surface, or, if they show a disposition to sink, by throwing them on a grating, so that they may be supported on the surface.

I have not had the opportunity of testing this suggestion, which I should much prefer, before making it, as I have never been troubled in this way. But if the explanation given in the article to which I here refer, be correct, as I am disposed to think, the plan of floating ought to succeed for the following reasons:

First, because the hyposulphite solution being specifically heavier than water, it would tend to leave the paper, and sink.

Second, in the experiment mentioned in the Journal, a bottle was filled to the brim with hyposulphite solution, a piece of albumenized paper was tied over it tightly, and the whole was immersed in distilled water, when the albumen film gradually swelled and bulged out, showing that strong solutions of hyposulphite could not be effectually washed through an albumen film. Therefore, it would be reasonable to suppose that we must get rid of it through the paper almost exclusively. And evidently it would be better, at least whilst the strong hyposulphite remained in the print, to effect the washing through the paper back only.

At least it may be said that this plan is worth trying. But as the evil evidently arises from some peculiarity in the paper which prevents a sufficient adhesion of the albumen film, the proper course to take would be one of prevention rather than of cure; that is, I would advise in working with such paper the addition of such substances to the albumen as will increase its adhesion to the hard substance of the paper, and for this purpose, nothing would seem so well suited as gelatine, which might be dissolved to a sufficient extent with the aid of a very gentle warmth, in the albumen.

Perhaps, even a better method would be the placing of the gelatine in the nitrate

bath; it is probable that enough would penetrate the albumen film to attach it firmly to the paper.

Formulæ for nitrate baths with gelatine will be found in most of our text-books; two are given in Prof. Towler's very useful handbook at p. 182. These are intended for nitrate baths. Mr. Palmer has lately introduced the same method into ammonio-nitrate printing, though with a different manipulation. In some shape or other it is hardly possible to doubt that the use of gelatine will afford a satisfactory and valuable remedy against blistering.

SPECKLED PHOTOGRAPHS, AND HOW TO MAKE THEM.

We are about to describe a process which, although not original, we do not remember having seen in print, and that is an easy formula for making *speckled photographs.*

Many operators have made them, doubtless, in great numbers; but after careful examination and much experimenting, they have been forced to give up the search, and declare that their efforts to discover how they were made were without avail. They would spare no care in making the negatives, and found them to be all right. The silvering solution would be renovated, aye, renewed, repeatedly, and the fuming-box kicked out of the room frequently, and as often replaced, yet ministers and congressmen, ladies and children, would all turn up in the toning solution with their faces excessively peppered. The printing-room was swept out clean, and floor scrubbed after each day's work, and the paper kept in a close box where no dust could reach it. Iron hinges were taken off the printing-frames, and brass ones substituted. The old tin roof, over which the water used for washing the prints, ran, was torn off, and a bran new, painted one was substituted. Detectives were sent out to see if they could discover any malicious factory chimney near by that might scatter its soot over the paper or roof, but without any discovery they returned. Daily did the prints present themselves nicely toned and looking well, with the exception of peppered faces and backgrounds, and you could not tell why. Ah! "I have it, you may say. It was the *paper*. Try some other paper, and you will be all right." But be not too fast. You are all too hasty to blame the *paper* for any trouble you may have, when the fault is probably your own. We will tell you how to make them. As we said before, the process is not our own, for we confess never to have worked it, but the batch of peppered prints before us, now, from a correspondent who has been making them for two months without knowing how, caused a little further investigation than we have described, and below we give the long-sought-for process.

Make the negatives with the usual care. Silver and fume your paper carefully, and print in the ordinary way. After you have printed all you wish, remove your prints to a dark-room, and before toning, cut them out with a knife on a piece of *sheet tin*, taking no care to remove the particles of tin displaced by the knife, or remove them as you please, and our word for it, your prints will, after washing, appear as thoroughly peppered and speckled as you could possibly (not) desire. Moral. Cut your prints out on glass or a raw hide block.

CHLORIDE OF GOLD.

Photographers who make their own chloride of gold will be interested in the following process, for which we are indebted to Thomas P. Shepherd, Esq., of Providence, R. I.

A quarter eagle ($2.50) contains 58 grains of pure gold. Dissolve this in ordinary muriatic acid, ½ ounce; nitric acid, 1 drachm. Evaporate to near dryness, and then add 4 ounces of water. Scrape in chalk in excess (the copper in the coin all falls down as carbonate of copper), and filter. Wash this, then filter, clean with water, and make the whole up to 116 fluid drachms. Each fluid drachm will then contain one grain of the double chloride of gold and sodium.

"I hope your Journal may ere long stand without a rival, not only in America, but if it were possible, in Europe. I find what I want in it."

Prof. O. N. Rood.

Statement of Bases and Parts of Iodine and Bromine in different Collodions.

FOR THE PHILADELPHIA PHOTOGRAPHER.

Formulæ.	Parts of Iodine.	Parts of Bases.	Parts of Bromine.	Parts of Bases.
C. Sellers (Copying).				
Collodion, 1 oz.				
Iod. ammo., 5 grs.	4,380	620		
Bro. potass., 2 "			1,420	580
J. Bardwell.				
Collodion, 1 oz.				
Iod. lithium, 7 grs.	6,657	343		
Bro. cad., $2\frac{1}{10}$ "			1,176	824
S. Wortley (Instantaneous).				
Collodion, 1 oz.				
Iod. lithium, 12 grs.	11,412	588		
Bro. " $5\frac{1}{10}$ "			$4,717\frac{1}{2}$	$382\frac{1}{2}$
Col. Pike (Microscopic).				
Iod. potass., $9\frac{1}{4}$ grs.	7,067	2,183		
Bro. cadm. $2\frac{3}{4}$ "			1,617	1,133
Collodion, 1 oz.				
Prof. Towler.				
Collodion, 1 oz.				
Iod. zinc, $2\frac{1}{4}$ grs.	1,791	459		
" cad., $2\frac{1}{4}$ "	$1,561\frac{1}{2}$	$688\frac{1}{2}$		
Bro. " $1\frac{1}{8}$ "			$661\frac{1}{2}$	$463\frac{1}{2}$

Formulæ.	Parts of Iodine.	Parts of Bases.	Parts of Bromine.	Parts of Bases.
N. Burgess.				
Collodion, 1 oz.				
Iod. ammo., 6 grs.	5,256	744		
Bro. " 3 "			2,448	552
Do.				
Collodion, 1 oz.				
Iod. cad., 7 grs.	4,858	2,142		
Bro. " 3 "			1,764	1,236
Do.				
Collodion, 1 oz.				
Iod. potass., 8 grs.	6,112	1,888		
Bro. ammo., 3 "			2,448	552
Do.				
Collodion, 1 oz.				
Iod. cad., 6 grs.	4,164	1,836		
" potass., 5 "	3,820	1,180		
Bro. cadm., 3 "			1,764	1,236
Collodion, 1 oz.				
Iod. ammo., $4\frac{1}{2}$ grs.	3,942	558		
Bro. potass., 3 "			2,130	870
Collodion, 1 oz.				
Iod. lithium, $1\frac{7}{8}$ grs.	$1,783\frac{1}{8}$	$91\frac{7}{8}$		
" cadm., $1\frac{7}{8}$ "	$1,301\frac{1}{4}$	$573\frac{3}{4}$		
Bro. ammo., $1\frac{1}{4}$ "			1,020	230

Formulæ.	Parts of Iodine.	Parts of Bases.	Parts of Bromine.	Parts of Bases.
L. W. B.				
Iod. sod., 4 grs.	3,388	612		
" ammo., 3 "	2,628	392		
Bro. cadm., $2\frac{1}{2}$ "			1,470	1,030

Mr. Editor: The latter formula is the one I use, and find it to work very well *in every way.* To aid in making collodion may I put the following

QUERIES.

1. Are the proportions of bases to be consulted, or proportions of iodine and bromine?
2. In what ratio?
3. If bases are not needed in collodions, why not bromo-iodize with pure bromine and iodine?

Truly yours,

Proselyte.

ANSWERS.

1. Of iodine and bromine.
2. Iodine, 2 to from 1 to 2 of bromine.
3. The negative bath would become intensely acid, and if it did not, the fumes in coating would be intolerable.

Such a system would be utterly impracticable in every way.

The above statement was prepared by a correspondent in New Orleans, and will be found very interesting.

The Awards at the Boston and New York Exhibitions.

Photography has had her fair brow bedecked with another glorious wreath of laurels, fairly won. This is cheering and encouraging, and will, we trust, awaken the interest of our photographers in such exhibitions, and that in future Photography may be among the main features on all such occasions. Nothing will tend to ennoble the art more than such generous rivalry as these exhibitions will create.

The awards of the Massachusetts Charitable Mechanics' Association at Boston, were, viz.:

Black & Case, Porcelain Pictures, Gold medal.
" " Photographs, Silver medal.
Bierstadt Brothers, Stereoscopic Views, Bronze medal.
T. R. Burnam, Photographs, Diploma.
Saml. Masury, Colored Porcelains, Bronze medal.
A. Sonrel, Photographs, Diploma.
Augustus Marshall, Photographs, Diploma.
Fuller & Smith, Photograph Cards, Diploma.
Edward L. Allen, Photographs, Bronze medal.
R. J. Chute, Photograph Cards, Diploma.
John P. Soule, Photograph Copies of Works of Art, Diploma.
John A. Whipple, Photographs, Commendation.
Geo. L. D. Barton, Stereoscopic Views, Diploma.
Joseph L. Bates,* Stereoscopes, Bronze medal.
Augustus L. Hudson, Photo Apparatus, Bronze medal.

At the Fair of the American Institute at New York, the exhibitors being fewer in number, of course the awards were fewer than those made at Boston, and were as follows:

F. Gutekunst, for best plain photograph (said to be the one of Lieut.-General Grant), gold medal; Williamson, for best "Imperial"† photograph, gold medal; Rockwood & Co., for colored pictures on porcelain glass (the highest award for them), silver medal; Rockwood & Co., for best architectural photographs, silver medal; Oscar G. Mason, for an enlarged photograph of the moon,—original negative by Louis M. Rutherfurd, Esq.,—a *discretionary* silver medal; Daguerre Manuf. Company—D. D. T. Davie, Chemist,—for Helion Cotton, —— medal.

We also mention with pleasure, that at an exhibition held at Reading, Mr. Charles A. Saylor bore away the premium for the best photographs. If any of our other subscribers have been equally fortunate, we shall be glad to record it.

* Mr. Bates (Secretary) will please accept our thanks for a copy of the report of the Mass. Ch. Mech. Association.

† What *is* an "*Imperial*" photograph? We always understood such as Mr. Gutekunst's Grant to be of Imperial size, but it was entirely different from anything Mr. Williamson exhibited.

How to Sit, and What to Wear.

Parties who sit for their photographs are too prone to censure the operator when they are not pleased with the result, and seem to think that he has the whole matter under his control, and must answer for any and every defect that may occur. This should not be so. The sitter is quite as much concerned in the matter as the operator, and should, therefore, do all he can to help produce a satisfactory portrait. Unless this is done the efforts of the poor photographer will be in vain, and the time of both wasted. Great want of taste in dress is continually displayed, and many seem to think that, in sitting for a picture, they should assume the most unnatural and unlike expression possible; and in their efforts to make themselves appear handsome, they destroy all the natural beauty of expression that their faces are possessed of. This should not be so either. The best way is not to *try* to look any way at all. Enter the gallery, sit down as if you were about to engage in conversation with some friend or relation, and except your dress, leave the rest to your operator. If you are awkward or nervous, do not insist on a standing position, or on having the left side of your face taken, when the operator assures you the right will be best.

Mr. Bannister, of England, has recently published a little volume, containing much useful matter on this subject, from which we have extracted largely in *Photographic Mosaics.* The matter was in type for this Journal, but we could not find room for it. The article is well worth the price of *Mosaics*, and should be read by all.

LECTURE ON PHOTOGRAPHY.*

BY COLEMAN SELLERS.

[Our esteemed co-worker, COLEMAN SELLERS, Esq., delivered the first of a series of *four* lectures on Photography, on Friday evening, January 12, 1866. It is our purpose to publish the whole of them in full, giving a section or part each month, and they will probably extend through the whole of the present volume. They will be of infinite value to all interested in Photography, as Mr. Sellers is one of the pioneers of the art in this country, and his papers on the subject are always read with great avidity, pleasure, and profit. As they are delivered in greater part *extemporaneously*, no opportunity will be afforded of securing them other than through these pages.—ED.]

LADIES AND GENTLEMEN: The discovery of every new art calls for its designation by some name. Sometimes it receives that of its originator, as the Daguerreotype serves to perpetuate the fame of Daguerre. This system of naming is usually applied to some specific process, as the one just alluded to, in which the term is applicable only to pictures made upon silver plates by what was supposed to be the action of light. At other times the name indicates some peculiarity of the process, as ferrotype, ambrotype, &c.

The whole art of picture-making by what was supposed to be the action of light, has generally been called by the term photography, *i. e.*, writing, or drawing by light.

In every art or science, all observed effects or phenomena have technical names given to them; these names are useful so far as they enable us to speak of the phenomena in fewer words than could be otherwise done without them. They form almost a language by themselves. This is noticeable in books in which writers try, as it were, to introduce as many of those words as possible. Being intelligible to the man of science, but an unknown language to the uninitiated, many are deterred from interesting themselves with scientific pursuits from this very cause. Photography has its technical terms, too, but fortunately all that is required can be taught without the use of many of them, except such as are familiar to you, from constant use in ordinary conversation. I shall avoid their use as much as possible, for I desire to show you that photography is very simple, very easily acquired, and eminently suited to be adopted as a pastime.

The number who receive pleasure from its pursuit in this manner is increasing. Societies devoted to it exclusively, exist in the principal cities. Many journals are filled with photographic matter alone. In Philadelphia, a most prosperous photographic journal is published, and it is better than any other in this country. I allude to *The Philadelphia Photographer*. We also have the best Photographic Society in the country, located in our city. With so prolific a theme I cannot hope in four short lectures to tell you all that is known of the art. I shall make the lectures elementary. If you will kindly follow me through, you will be able to practise the art to your own satisfaction, and to the satisfaction of your friends, who you will find quite willing to be photographed, and to have you give them specimens of your handiwork.—I have said photography means literally drawing or writing by light, hence light would seem to be the chief agent of the process. Webster defines *light* as the "agent which produces vision." Let us consider this, and see whether the agent which produces vision is the same as that which produces the photographic image. We have senses enabling us to perceive, and make use of various natural phenomena, and the impressions or phenomena produced on other different senses are different from one another. Thus, as light is only used by us to enable us to distinguish objects as to form, dimensions, and color, we infer it is a different agent from *heat*, which can be only appreciated by the sense of touch. Although some objects have both the properties of light and *heat*, yet we do not confound them. Suppose, as in the instance of picture-making, a chemically prepared plate be placed in contact with a plate of glass upon which an opaque image is traced, and these two are placed in the sunlight, and when so exposed, the paper blackens in all parts, except those protected by the image. We would naturally infer that it was light which made the picture. But supposing in future experiments we were to find that it

* Delivered at the Franklin Institute, January 12, 1866. Phonographically reported by C. R. Morgan, M.D.

succeeded better when there was more heat in that light, as the hotter the sun, the better the picture, and that by standing it up near a stove, we could still produce the same impression. We would then conclude that the effect was due to heat, and not to light. I give this example, not that such is the case, but to prepare your minds for what I will now show you, namely, that photography is really a misnomer. That light, so far as it is an agent in producing vision, has no more to do with making the photographic image than it has to do with cooking your dinner. If we consider heat and light as distinct, because they are appreciated by different senses, so we must consider the picture-making agent distinct from heat and light, so soon as we become possessed of some means whereby we can note its separate existence; and even if we afterwards discover that heat, light, and this picture-making agent are all due to one *agent*, it would not even then do to call them all by the same name, or to confound them one with the other, any more than it would do for us to break down the distinctions now existing between ice, water, and steam, because they are all water, only in another form, and under different conditions.

We are taught that all space and most matter is pervaded by some subtle medium called luminiferous ether, the existence of which can only be inferred, and that the vibrations of the atoms of matter impart to this ether certain wave motions of different degrees of intensity, just as the vibrations of the musical chords impart to the air wave motions which strike upon the delicate organs of hearing, and convey to the mind the idea of harmonious sounds; the tone being dependent upon the rate of vibration. The lower rate is supposed to develop the sense of feeling, higher rates impress the eye and produce the sensation of sight, while still more rapid rates fail to impress the eye, but certain chemical effects are produced, to which the term actinism is applied; and it is actinism which makes the photographic picture upon the prepared plate. White light, such as is furnished by the noonday sun, is supposed to be made up of wave motions running through a scale of different degrees of intensity, each wave maintaining its own integrity and all harmonizing as do the musical chords, each starting separate rates of vibration in the air, but which come to the ear as perfect harmony. What is true of sunlight is true, also, of the various artificial lights. We select for experiment this evening the lime light as the one best suited to take the place of daylight, when under the skilful management of Prof. Morton. There are other lights which possess more actinism without being so brilliant, as for instance the magnesium. I wish you to observe the intensity of this light, and see how powerful it seems. The gaslight is quite yellow in comparison with it. With this light there is also a great deal of heat. The amount of heat can be determined by instruments. To this light I shall now expose an ordinary photographic plate. I will tell you how these plates are prepared at a subsequent lecture. I shall throw a shadow on a portion of the plate with my hand. Of course, the hand will cast a sharp shadow upon the film, and then I shall develop that film. There is no visible effect produced on the plate by the light, and the effect is what is called latent. It is brought out by what we term developers, which are poured upon the plate afterwards. You see the impression upon the plate; the shadow of my hand is light, all the rest of the plate is blackened; this is what is called the negative; the light will afterwards, in forming the positive, shine more readily through the transparent part. This experiment with these rays of light shows us that it has the picture-making power, but does not show us that actinism is different from light. This I shall now proceed to do. When rays of light pass from a rarer into a denser medium obliquely, they are bent from their course, and that bending is called refraction. We will suppose these are rays of light, striking upon this prism of glass, or some substance which has a refractive power, to a great extent. The ray strikes it, and passes out with a certain amount of divergence, but if a ray of combined heat and light be allowed to *fall* upon this prism, the heat and light rays are bent at different degrees. The light which entered as white light does not come out as such, it does not appear as

it did on its entrance; it is broken up into what is called the spectrum. It is broken up into different colors. You will observe the *red* is the least bent from its course. The yellow, orange, green, and blue in turn, more and more bent, and so passing on to violet, which is refracted the most of all. These various colors are in the undulatory theory merely vibrations of ether, travelling at different *rates*, the red at a slower rate than any of the others and so on each successive color travelling more and more rapidly till it comes to the most rapid visible vibration, the *violet*. Heat rays also suffer a certain degree of bending. But not to the same extent that the light rays do. When the heat rays and the light rays combined pass through the prism, a large amount of heat is found *near* the *red*. It is found that the heat can be felt to a distance away beyond the *red* entirely off in the darkness.

Now, the actinic rays are also bent, but to a much greater extent than the light rays are. The lightest part of the spectrum would be on the yellow, much the darkest part would be on the violet; the greatest actinic effect would be somewhere in the violet or blue, and extending off five or six times the length of the visible spectrum. Prof. Morton will now throw the light through such a prism, and will decompose it (the light), and then you will observe the colors as they are produced by this bending. The light passing through a small narrow opening from the cylinder of lime, then through certain lenses, is thrown upon the prism of glass containing bisulphide of carbon, which has a dispersive power to a wonderful extent. You *see* the spectrum. The most *heat* is at the red end of the spectrum.

Prof. Tyndal, in experimenting with heat in his interesting lectures, which have been so deservedly popular, showed that the invisible heat rays produced an impression or effect some four times the length of the spectrum from the *red side*. Here is the yellow, then comes the green, passing gradually into the violet, and dispersing. Much the largest amount of actinic effect is in this part of the spectrum. The actinic effect also exists where my hand is. There is not light where my hand is. You see my hand from the little light of the gasburners in the room. But it is not illuminated by the spectrum itself at all. But there is in reality a band of invisible rays five or six times the length of the visible spectrum, passing off into darkness.

Prof. Morton will now allow the light to fall upon a small screen, in order to expose to it a chemically prepared plate, similar to the one I used in the previous experiment. The spectrum will have to be much shorter in this case than before. I want the visible spectrum to occupy only a portion of the length of the plate. You can all see that the spectrum is not more than three inches long. I shall place this plate now so that the red rays shall fall on one end of the plate; the blue will reach probably further on, to the middle, and beyond this there will be no visible image. I will place it thus, and allow some time for the actinism to impress it, and you will see a chemical effect beyond the visible spectrum. There is far much the largest amount of light from the yellow, the least amount from the blue, and so far as light is the agent enabling us to see, so much the more powerful is the yellow for carrying out the ends of it. I shall now develop this plate. The yellow light fell where my finger was. There the yellow, here the blue; all the rest beyond where the greatest impression has been occurred in darkness, and if we had allowed the plate a longer exposure to the light richer in actinic rays, it would have been extended much further. There is one difficulty in photographing these things at night; the lime light is not a light very rich in such rays, not so rich as the sunlight or the magnesium light; these invisible rays, which extend beyond the violet end of the spectrum, may be rendered visible, by placing in their path some substance which has fluorescent properties, as uranium-colored glass. Now, if a plate of such glass be exposed to these invisible rays, it would show a fluorescent glow; it would glow like the emerald. If we should, however, put a thin piece of glass between the prism and the uranium glass, the thin piece of glass would obstruct to a great extent these delicate rays; it would not glow to such an extent. If, in the place of the glass, we in-

troduce a thick piece of quartz or rock crystal, it would seem not to interfere at all with these delicate rays. Therefore, when in such experiments it is desired to show to how great a distance beyond the visible spectrum the actinic rays extend, it becomes necessary that the prism and the lenses of the ordinary lantern should not be made of glass; they should be of quartz. Many persons have advocated the use of lenses of quartz to gain this non-abstraction of the chemical rays or actinism.

(To be continued.)

ON MAGNESIUM AND DEVELOPMENT.

I INCLOSE you two vignette cards, the negatives of which were taken between 9 and 10 o'clock, Christmas evening, by the aid of magnesium light. I took them in my gallery, the subject seated as in daylight; the light, composed of two magnesium strands, was held in the direction of my sky-light and front light, or at an angle of about forty degrees from the horizon. A muslin reflector was used to soften the shades in No. 1, and a large mirror in No. 2. The shades in No. 2, as you will perceive, are a little softer in proportion to the general depth of the print; otherwise the print is not so pleasing as No. 1. In the latter the light was a little more at the side, and higher, perhaps, than in No. 2. The general effect is good, but susceptible of improvement. With a little practice and study, I think the magnesium light will be an entire success. I am glad to see your Journal discussing the matter.

There is much being said about new developers, and, I fear, to little purpose. The aim seems to be to produce the desired intensity with one development. Now, such an end should not be desired, if my opinion is worth anything. As Mr. Wenderoth truly says, we should labor to make "soft negatives," of fine gradations of light and shade, with perfect modelling of the subject, an end which cannot always be reached by one development.

I have not tried the gelatine developer, and would not condemn it "unheard," only I would object to any developer to produce such intensity as is required in the high lights generally. The ordinary iron developer and pyrogallic re-developer are entirely manageable, and any degree of intensity, strength of contrast, or definition in tone may be produced by them, and is it not better to spend a minute longer time to obtain a better negative? The first thing, it occurs to me, is to obtain a foundation picture, if you please, possessing all the gradations of lights and shades, or rather, showing all the minutiæ in the heavier shadows, which is to be done with the iron developer, and then build up the lights with repeated deposits of silver, by re-developing with pyrogallic acid.

In this way the operator has entire control over his negative, and time to watch its progress. I send you a print showing the definition I speak of, although it is a little over-printed.

We may be just as sure of such results as that, if we have good subjects and chemicals in order. Much depends upon the subject, and the light must be arranged for every change of subject; and as the subject varies in "contrasts," not only the light should be re-arranged, but the developers should be varied in their proportions of iron, acids, and silver.

Yours, truly,

J. Q. A. TRESIZE.

ZANESVILLE, OHIO, Jan. 8, 1866.

The magnesium *cartes* sent by our correspondent certainly speak very highly for the new light, and we think he knows pretty well how to manage it. The negatives are beautifully sharp in every respect, having only one fault, and that is the shadow of the subject's nose upon his face. This we must get rid of, and we hope Mr. Tresize will make further experiments with us during the coming month, and report with us in our next. While the other is very good, we like the picture marked No. 2 the best, and think it the most successful.

While we admit that excellent results can be obtained as he suggests, we cannot accord with his ideas of development. One of the first lessons we learned was, that *the best way to intensify is not to intensify at all*, and we hang on to the idea with all of our first love for it. We think much, *very*

much, is dependent upon the developer, and if something can be obtained that will, on first development, give the proper strength to the negative, it will be a precious boon to those who do not so well know how to manage in the dark closet as does our good friend Tresize. His remarks on the arrangement of light are to the purpose, and yet, truthful as they are, hundreds of photographers are this day taking every subject, man, woman, and child, in the same light, on the same square foot of floor—witness the worn carpet or oil cloth—on the same chair, with the same stern pedestal and the same fancy background.—Ed.

PORTRAITURE BY MAGNESIUM LIGHT.

BY M. CAREY LEA.

The principles that must govern the taking of portraits by this new source of light are somewhat different from those of ordinary illumination, and I have been asked to put some views, expressed by me on this subject, upon paper for *The Photographer*, which I do with pleasure.

It is to be remembered that the distance of the sun is so great, that the difference in illumination which falls upon the sitter and the background, is inappreciable (if the glass-room is well-constructed). But with a light whose origin is close to the object, the ordinary law of illumination comes into play, viz., that the intensity is inversely as the square of the distance. Thus supposing the magnesium to be burned at a distance of seven feet from the sitter, and the background to be five feet behind him, the intensity of the light on the two will be in the proportion of 7^2 to 12^2, or as 49 to 144. That is, the light on the sitter will be nearly three times as strong as that on the background.

The effect of this is to make the background black and inky, giving a dull heavy look to the whole work.

The correction evidently lies in either bringing the background nearer, or else in using a very much lighter one. Probably the last will be found best, as there will be less danger of ugly shadows—another common fault in magnesium work.

Another fault in the new pictures is that the contrasts are too great, and the same defects are visible as are produced in sun pictures by inexperienced hands. The remedy in this case will be found, I think, in largely increasing the dose of bromide in the collodion. In fact, the faults of the new pictures are exactly those which were most perceptible in the pictures taken upon iodide films before the use of bromide became general. Evidently the remedy lies in increasing the softening agency of the bromide. Recent experiments by Vogel directed expressly to this end, have confirmed what all believed who had looked into the subject, that, whilst iodide films are more sensitive than bromide to *strong* lights, bromide films are more sensitive to weak ones than iodide. Therefore, *irregularity of illumination* is always best corrected by liberal use of bromide, a fact of which skilful philosophers know how to avail themselves.

A strong developer seems also needed for magnesium work: a liberal use of sulphate of iron, and a sparing one of acetic acid. Every one has his own views as to developer, and it seems better merely to recommend each operator to strengthen the developer beyond what he habitually uses than to name any definite strength of developer, unsupported by specific trials. In general terms, however, a developer containing 30 to 35 grs. of iron to the ounce, with one ounce of acetic acid to 15 or 20 of iron solution, would seem about right. If anything, rather more iron and less acetic acid than the reverse.

OPALOTYPES ON IRON.

Beautiful as they are, many faults attend pictures on porcelain or opal glass. First, it is difficult to get glass straight enough to insure perfect contact in printing them, thus preventing sharpness; secondly, very careful handling is required, lest they should break in the operator's hands; and thirdly, the glass now made is so excessively brittle, it cannot be cut into desired shapes without much risk and difficulty, to say nothing of its imperfect surface.

Mr. V. M. Griswold, manufacturer of the well-known Ferrotype plates, has, for the last nine years, been working faithfully and

perseveringly to produce an opal surface upon an iron plate, that would not only be all that could be desired for plain photographs, but to have such a surface as would admit of the same delicate and artistic coloring as do ivory and opal glass. He has at last been enabled to exclaim Eureka! The pictures shown us by him the day of this writing, seem to be fully up to the desired standard, yet he modestly asserts that they are *nothing* to what *can* be done by his new process, which has been patented in this country, France, and England, and preparations to work which he hopes soon to be able to present commercially before the public. His process furnishes a substitute for pictures on opal glass.

Not only are pictures made by it much cheaper, but they possess some other advantages over the latter. They will not break or crack; they can be printed sharp, and perfectly defined in the lights and shades; they will admit of any imaginable tone, and are susceptible of being wrought to the highest perfection of art, either in oil or water color. Being upon iron, they can be cut into any shape desired, which will cause a new field to be opened in the way of lockets and medallions, at present an impossibility with opal glass, as it splits off in every direction, when it is attempted to cut it.

The pictures are taken either by the ordinary wet, or by the collodio-chloride process, upon a film which dries white and opaque; are printed with perfect ease, either by contact or development; are quite as easy to make as paper prints, and require only ordinary care to secure most beautiful results.

Those shown us by Mr. Griswold were of both portraits and landscapes, and were equally beautiful of both. There is a delicacy and finish about them which is much to be admired. Of course, we have to test their merits as soon as we are enabled to do so. We believe they are all that is claimed for them as to coloring, and if they are, they will rapidly become popular.

We hope to be able to announce in our next that the enamel and other preparations required, are in the market, to publish Mr. Griswold's formula for making them, and also to say more about them.

TO REDUCE AN OVERDEVELOPED NEGATIVE.

Very often it occurs that negatives are overdeveloped to such an extent as to render them almost useless. By the following simple process they can be reduced and made to print well. First, remove the varnish by alcohol, and wash them well. Then put them in a pan with one pint of water and two drops of acid pernitrate of mercury, and then develop over again. Then dry and varnish as before.

The pernitrate works slowly, and should be watched until the negative is thought to be all right.

To make pernitrate of mercury, take of

Mercury,	3 ounces troy.
Nitric acid,	5 " "
Distilled water,	6 drachms.

Dissolve the mercury with the aid of gentle heat in the acid, previously mixed with the distilled water. When reddish vapors cease to rise, evaporate the liquid to seven troy ounces and a half, and keep it in a well-stoppered bottle.

A NEW SINK FOR PHOTOGRAPHERS.

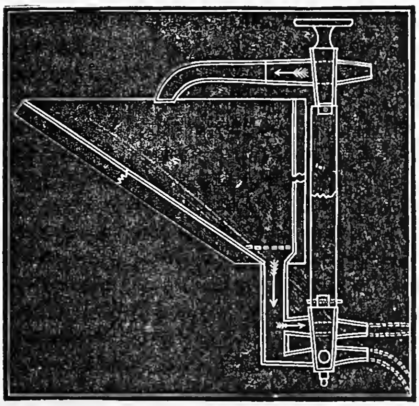
BY J. C. LEAKE.*

I have to introduce to your notice this evening a sink for use in the dark-room, which I have designed with a view of saving some of the silver usually lost during the development of negatives.

We will suppose ourselves about to develop a negative in the usual way, over a sink of the ordinary construction. On pouring the iron solution over the plate, a certain portion flows over, carrying with it a portion of silver, and, the development being completed, the plate is drained, washed, and the remaining portion of silver retained on the plate from the bath passes down the sink, and is lost. In like manner the intensifying solutions of pyrogallic acid and silver and the fixing solutions run away, and are lost, a large quantity of silver being thus wasted.

* Read at the South London Photographic Society, Nov. 9th.

When the photographer has plenty of space, the loss may be avoided in various ways. Two sinks may be used; one for developing and fixing, the other for washing the plate. Or he may have a large tank, into which the whole of the solutions, with the water used in washing, may run. This is, of course, the most complete system, as the whole of the silver may be recovered from the solution. But it is not often that space can be spared for the carrying out of either of these operations. I have, therefore, devised a plan by which I think a large proportion of silver will be saved, while a space no larger than that required for a sink of the old construction will be required.



The sink which I have constructed consists of a box of wood, one side (which when in use forms the back) of which is upright, while the other three slope inwards toward the bottom, forming a sort of square funnel. This is lined with lead in the usual manner. The neck is formed by a piece of lead or brass tubing, about six inches long and one and a half inch diameter, and which is stopped at the bottom. Into this is inserted a sort of double stopcock, the plug of which is so bored that when *one* tube is open, the other is shut. These taps are firmly attached by means of an iron rod to the lower part of the tap used to regulate the supply of water over the sink; and are so arranged that when the water is turned on into the sink that portion of the stopcock leading to the water is turned on also, while that leading to the vessels containing the silver solution is turned off, thus allowing the water used in washing to flow away. The simple act of turning off the water supply at once turning off the escape pipe, and opening that leading to the reservoir containing the solutions, which, of course, remains open until the water is again turned on for washing the plates.

If we now proceed to develop a plate, the overflow of the developing solution at once flows down the tube into the reservoir, and is saved; as is also the solution drained off on the completion of the development. Then the waste being turned on, the opening to the reservoir is closed, while that to the watse is opened, and the water flows freely away. For intensifying (and also for fixing, should cyanide be used), the same operation is gone through, and the solutions are thus saved without any trouble or loss of time to the operator.

A sink of this form possesses also the following advantages: first, there is no splashing, on account of the sloping sides upon which the water falls; and, secondly, that as the sink is kept drained, and is, in fact, washed out in the act of washing each plate, no injurious fumes are likely to arise to cause the ill health of the operator, as in the old form of sink, when the solutions were allowed to mix freely in an open vessel which was never perfectly freed from them.

News.

PHOTOGRAPHIC SUMMARY.

BY M. CAREY LEA.

ENGLAND.

Collodio-Chloride Printing. — The News gives the following formula. Prepare three solutions.

No. 1.	Nitrate of silver, .	. 1 drachm.
	Distilled water, .	. 1 "
No. 2.	Chloride of calcium,	. 16 grains.
	Alcohol, . .	. 1 ounce.
No. 3.	Citric acid, . .	. 16 grains.
	Alcohol, . .	. 1 ounce.

To each ounce of plain collodion add nine minims of No. 1 mixed with a drachm of alcohol, and shake well after adding. Then a drachm each of Nos. 2 and 3, shaking well. This formula is said to give excellent results for opalotypes. No preliminary coat-

ing was found necessary by Mr. Simpson, who recommends this formula.

As collodio-chloride prints easily become overtoned and blue, it is recommended to tone them in a weak, old, acetate toning bath. In making a new bath for the purpose, add 1 grain of chloride of gold to a pint of water, and neutralize with a little alkali. The prints do not lose in fixing like paper prints, but rather darken.

In case of a lack of vigor, add more pyroxyline to the collodion.

Keeping Plates after Leaving the Bath.—In answer to a correspondent who complains that his plates become unfit for use, almost immediately after leaving the bath, in consequence of the bath solution being repelled by the films, and collecting in drops and patches, whilst he sees other photographers able to keep their plates half an hour and even three quarters between sensitizing and developing, the News enters into an editorial examination of the matter. Mr. Simpson concludes, first, that conditions of the collodion have something to do with it, a horny collodion tending to produce them. Second. That the saline compounds exert influence, iodide and bromide of cadmium tending to make collodion glutinous and repelling, whilst alkaline iodide exerts a contrary effect. Third. That a new bath tends the same way, in consequence of its not containing alcohol and ether in any quantity.

The advice given to remedy this evil, which the editor believes to be quite common in occurrence among photographers, is, 1st, immersing the plate whilst it is quite fresh, and not giving time to the collodion to harden too much. 2d. Giving a long immersion with frequent agitation. 3d. Addition of a drop of distilled water to each ounce of collodion. 4th. Agitating the collodion with about one-third of a grain of carbonate of potash to the ounce, letting stand twenty-four hours, and decanting from the sediment. This tends to make the collodion limpid and permeable, and if a tendency to fog should manifest itself, it may generally be removed by a little tincture of iodine.

Fading of Prints.—Some interesting articles have appeared in the British Journal on this subject. It is pretty clearly shown that much fading arises from the cards used from mouuting, and also, in many cases, from the adhesive material used to attach the prints to their mounts. In some cases, but more rarely, the quality of the photographic paper itself has been found to be defective.

All white paper is rendered so by bleaching with hypochlorite of lime, the active portion of the mixed substance sold as chloride of lime. If this were left in the pulp, it would rot it; it is therefore removed by a reducing agent or "antichlor," for which purpose hyposulphite of soda is generally employed.

If the whole of the excess of the hyposulphite has not been removed, it produces spots and stains in the prints, of which the germs can be seen even before exposure. This is one of the least of the evils, least because it is immediately detected, and the paper rejected. The serious evils are those which do not show themselves until it is too late, and especially in the presence of the antichlor or hyposulphite in the paper of which the mounting cards are made.

As less importance is attached to these cards as a source of danger than the case deserves, any white pasteboard in the market is generally taken, with little reference to the care taken in its making. It consequently follows that such cards often contain material which exercises a most destructive effect on the photographs mounted upon it. Cases are common in which a portion of a lot of prints which have not been mounted, have lasted perfectly well, whilst all that have been mounted have faded. Even an instance is cited in which a lot of prints had been attached only by their edges. All the borders so attached faded, whilst the rest of the print was entirely permanent, that is, the portion which had been brought into contact by the adhesive substance with the mount, absorbed from it sufficient destructive substance to ruin the print, whilst the portion that was detached, though resting so close to it, escaped.

Of course, this case may be explained differently, and attributed to the use of bad adhesive material. There is no doubt that much mischief may be done by some of it. And, indeed, nearly all the materials used

for attaching prints are liable to become mouldy and sour by dampness—glue, starch paste, and gum all have this unfortunate defect. It has been suggested that India-rubber or gutta-percha dissolved in some of the hydrocarbons obtained by the distillation of coal or oil, might be more useful, and there is no doubt whatever, that such a preparation would possess immense advantages, as it would, to some moderate extent, preserve the print from the action of any injurious substance in the paper beneath.

Another interesting paper in the Journal describes the results of careful experiments by Mr. Barraclough, on the effects of dampness. That gentleman cut up a large photograph into eight pieces, and exposed them on a damp wall, variously protected, some between glasses, others with sheet lead, and some not at all. The result was very marked. The preservation was exactly in proportion to the protection. Dampness showed itself a terrible agent of destruction, probably acting in many ways, not merely bringing the noxious substances in the mount into the print, but also rendering the metals in the picture more susceptible of injury from atmospheric agencies.

It is evident from this that we need to have card-boards prepared for photographic purpose, with almost the same care as is taken with photographic paper. And meanwhile it is to be observed that *printing a lithographic tint* on boards, on which to glue the print, cannot but have a very beneficial tendency to interpose an obstacle to the action of deleterious substances in the board, upon the print. And those who value permanency would do well not only to have all their own prints so mounted, but to purchase none but those with which this useful precaution has been taken.

All this is evidently a strong argument in favor of pictures on glass, in which certainly one source of danger is entirely removed, and which have, therefore, an unquestionably greater chance of permanence than pictures on paper. Collodion, too, is in some respects a safer vehicle for the sensitive salts than albumen, at least when freshly iodo-bromized, as it then does not seem to form any insoluble sensitive compound with silver.

ITALY.

New Light. — Professor Carlevaris, of Turin, published not long since a statement that by the substitution of magnesia for lime in the calcium light, a far brighter light could be obtained, and one rivalling that obtained by burning magnesium wire.

This statement was loudly called in question, and it was asserted that no such advantage existed.

The last number of the Camera Oscura, however, contains an account of trials made by Carlevaris in the presence of the Minister. The result was exceedingly favorable; it was affirmed that the cost of illumination was reduced to one-fourth that of the ordinary lime light, and it is asserted that the new system will be adopted in the light-houses.

Carlevaris also exhibited successful portraits by the same agency.

The same journal states that a mixture of two parts magnesium and one of zinc, burns quietly with a splendid blue light.

PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

Stated Meeting, Wednesday Evening, January 3, 1866.

Mr. Tilghman, Vice-President, was in the chair.

The minutes of the last meeting were read and approved.

Dr. William Thomson was unanimously elected a corresponding member of the Society.

The Secretary reported a donation of prints from Dr. Thomson; one of the interior of the Cathedral of St. Peter and St. Paul, from F. Gutekunst; prints from negatives made by Mr. J. C. Browne, by aid of magnesium light, from Wilson & Hood, and a copy of *Photographic Mosaics*, from Benerman & Wilson. Thanks were voted to all of the gentlemen named, and also to Mr. Davids for a fine *study from Nature*, and to Mr. Corlies for a view from a tannin plate, three years and four months old. This plate was made with a 6-in. Globe lens, three minutes' exposure, and four days expired between the time of exposure and the development.

The discussion on the Collo-developer being in order, Mr. Wenderoth produced six negatives of the same subject, made at the same time, and as follows:

No. 1. Exposure, 65 seconds; developed 55 seconds with the common iron developer. A well-timed negative and quite strong enough without re-development.

No. 2. Exposure, 65 seconds; developed 10 minutes with Mr. Lea's developer. Negative under-timed, printing weak, but not fogged.

No. 3. Exposure, 1 minute, 30 seconds; developed 15 minutes with Mr. Lea's developer, and found to be under-timed.

No. 4. Exposure, 2 minutes; developed 10 minutes with Mr. Lea's developer, and found under-timed.

No. 5. Exposure, two and a half minutes; developed two minutes with Mr. Lea's developer. Negative proved almost equal to No. 1.

No. 6. Exposure, 65 seconds. To show how long the iron development could be prolonged without fogging, this negative was developed 2 minutes, and Mr. Wenderoth "thought 5 minutes would not have destroyed the clearness of the negative.

"The Lea developer would not fog, but would increase the deposit on the shadows. When time was no object, and in case of an over-exposed negative, it might be an advantage." Attention was also called to the difference in color of the negatives, the brown of the old iron developer being preferred by Mr. Wenderoth to the bluish color of the other.

Messrs. Corlies and Fassitt had experimented with the new developer, and expressed their preference for the old. The new developer with the acetate of soda would not work at all with them, but the merest drop of sulphuric acid to the ounce of developer was found to be a great improvement.

Dr. Wilcocks read a very interesting correspondence with Mr. Rutherfurd, respecting his stereograph of the moon, and received the thanks of the Society for his pains.

"1003 Walnut Street,
Philadelphia, December 7, 1865.

"Dear Sir: At a meeting of the Photographic Society held last evening, the subject of the photograph of the moon made with your new lens corrected for actinic aberration was discussed, as well as your stereoscopic view of that luminary taken last year.

"The President of the Society stated, on the authority of two of his friends who had recently seen you, that the appearance of solidity was due not to the ordinary principle of stereoscopic pictures, but simply to the variation of the shadows.

"Mr. Edward Tilghman was present, and replied to the President that this was a mistake; that the principle concerned in your double views of the moon was identical with that brought into play in stereos of terrestrial objects.

"I then explained to the Society the character of the moon's orbit, particularly of its inclination to the ecliptic, and showed how our satellite being sometimes to the north, and sometimes to the south of that great circle, with the position of its poles in an unvarying direction, produces the *astronomical illusion* called *libration*, and affords the opportunity to obtain really different views of the moon.

"The Society seemed to understand the explanation, and to deem it satisfactory.

"At the request of the President, however, I write to you to ask you to favor us with a description of the mode of taking these photographs, and the rationale of the stereoscopic effect produced.

"Hoping that I am not taxing too heavily your valuable time,

"I am very sincerely yours,

"Alex. Wilcocks.

"Louis M. Rutherfurd, Esq.,
New York."

"175 Second Avenue,
New York, December 11, 1865.

"Alexander Wilcocks, M.D.

"Dear Sir: You are entirely right in your explanation of the stereoscopic vision obtained in the pictures of the moon, which is due to an apparent change in the position of the observer caused by a real change in the relative position of the object. By reason of its librations the moon presents to us the chance of obtaining pictures, now seeing a little more of the north pole, again more of the south, and at other times oscil-

lating from east to west, and thus making it possible to combine pictures for stereoscopic vision whose axes must lie in the direction of the change which the moon has undergone in the interval between the taking of the two pictures.

"I am not aware that I have ever, to myself or to any other person, admitted or given any other explanation than the above, which is obvious and sufficient.

"I would add that it is quite easy, by a choice of epochs for the two pictures, to exaggerate to a great degree the convexity of the moon, so that it may present the view of an egg seen end on, and if the axes of the pictures are not properly adjusted, the figure will not be symmetrical.

"In the course of my observations for the purpose of properly combining these pictures, I have discovered the singular fact that there is a certain normal relation which must be observed between the angle at which the pictures have been taken, and the distance apart of the lenses of the stereoscope, in order to obtain correct views of a symmetrical figure. Any one will become aware of this fact on looking at one of my stereographs of the full moon with an instrument (such as Emerson's), and alternately during the examination, separating and approaching the lenses: it will be seen that at some point of the adjustment the figure is that of a sphere, while on either side of this point it becomes flattened or elongated as the lenses are nearer or further apart than the true point.

"I am very truly yours, &c.,

"LOUIS M. RUTHERFURD."

A proposal to purchase a magnesium lamp for the purpose of exhibiting glass slides in the magic lantern resulted in the appointment of Messrs. Corlies, Sellers, and Tilghman as a Committee of Inquiry as to cost, &c., who are to report at the next meeting.

A motion to report the proceedings of the Society phonographically was lost.

On motion, adjourned.

STEREOSCOPES BY J. CARBUTT.

OUR readers will remember the account of his trip up the Mississippi given by Mr. John Carbutt, of Chicago, in our December issue. That was written while he was absent, and we now have substantial *proofs* of his doings while away, in the shape of a series of beautiful stereos. Mr. Carbutt has sent us some very fine pictures from time to time, but in this lot, in many cases he seems to have exceeded himself.

Being taken under the auspices of the Northwestern Packet Company, every opportunity was available for accomplishing all that could be desired. First, we have a fine picture of the steamer "Itasca," and one of the grand saloon of the "Northern Light," showing the magnificent style of the boats run by the Northwestern Packet Company. Large and handsome as these are, they are to be sold, and finer ones placed on the line, to accommodate the growing trade of this enterprising institution.

Next in order we have "Lookout and Railroad Cut at Fort Snelling," "Fort Snelling, from Dakotah Side," and a full view of the fort from the river, the latter giving a good idea of the strength of that important military post. Of the celebrated "Fountain Cave," near St. Paul, Minn., we have views of the approach thereto, its mouth, and a wonderful view of its *interior*, looking out. The latter is one of the most remarkable efforts of this kind we have ever seen. Nothing can be much finer.

Now, a series of five views of the "Dalles of the St. Croix" present themselves, which show the mysterious and beautiful windings of that splendid river as it flows along between its rocky sides. They all show fine manipulation and excellent definition, two or three, however, being very superior.

The "River Landing at Red Wing, Minn.," and the famous "Barn Bluff," also, at Red Wing, give a fine idea of the magnificent scenery in that direction. That huge bluff stands up like a great grim monster, hiding some mysterious country from the common gaze, and forbidding the curious to come too near.

"Maiden Rock on Lake Pepin," the beautiful "Falls of St. Anthony," from Minneapolis, and "Jam of Logs, Willow River Falls, Wis.," are all good views, the second being particularly pleasing.

Lastly, we have the magnificent bridge over the Mississippi at St. Paul, and a panoramic view of St. Paul. Such a suc-

cessful trip, with so many fine results, would cheer and repay any photographer for such a trip, and such trips are making Mr. Carbutt the Wilson of America, which position he justly deserves.

Accompanying these came two views of the Chamber of Commerce, and a front and back view of the splendid University of Chicago, showing our Western brethren to be fully up to our standard in such enterprises. In our next we hope to be able to state what lenses Mr. Carbutt uses, and how he secures such grand results.

OUR PICTURE.

THE subject of our present embellishment is so famous and so well-known that it is scarce worth while for us to say much about it. However, as some of our readers may not have played almost within hearing of its angry roar as we did when a child, we venture to tell such a little about Passaic Falls and its wondrous beauty. It is on the Passaic River at Paterson, New Jersey. The Indian name for the falls was *Totowa*, which, in their language, signified "*to sink or to be forced down beneath the water by weight.*" A great and terrible earthquake must have been the cause of this great split in the solid masonry of the surrounding hard rocks.

"The entire fall of water here was formerly estimated at seventy feet. The dam built across a few rods above has increased the height to eighty feet. The water, before it reaches the dam, is 'sweetly still,' affording excellent rowing and sailing for a distance of several miles up the Passaic. After the water glides over the dam, and leaps upon the rocky bed below, its course is swift and broken, one part of the stream striking directly through a narrow gulch towards the main cleft, and tumbling on its way in fierce commotion until it dashes, a volume of foam, into the walled depth.

"The main body of water pursues a line nearly straight with the course of the river until it meets the bend, then suddenly changing with the bank, it passes toward the yawning gap, and leaps impetuously into the chasm, at once a vast and crazy confusion of foam. 'It is an awful, grand and terrific sight, and when the whole flood of the river, swollen by heavy snows, and rains, and thaws, precipitates itself into the gulf, the bellowing thunders of the mighty flood, struggling for an outlet, and resisted by the walls of its prison-house, are reverberated by the surrounding hills with deafening roar.'

"The waters escape to the basin, through the deep ravine, seen in the picture, and then rest awhile after their maddening course, until at last, forced out by the pressure of the continued stream, they again hurry over a rocky bed until they are tranquillized in the passage less precipitous below the town.

"Among the most beautiful features of Passaic Falls are the rainbows formed by the reflection of the sunlight through the mists and floating wreaths of spray which ascend from the water, as they come foaming and dashing over the precipice."

There are many other delightful surroundings, which have made Passaic Falls a favorite place of resort in the summer. Among these are Garret Mountain, The Valley of the Rocks, Grotto of Records, The Reservoir, The Observatory, The Rock, The Chimney, The Camp Ground, Colt's Hill, Passaic Island, and the place from which Sam Patch made his famous leap. All of these favorite and beautiful spots are graphically described in a neat little volume published by Vanderhoven & Webb, Paterson, N. J., called "Visitor's Guide to Passaic Falls." We cannot here describe them all. Like great prison-walls these palisades stand high up above the roaring waters, as if to keep them within bounds, as they foam over the great rocks. Our artist has succeeded well in making this view, and quite as well in making several other views, both in winter and summer, and at different points, of much larger size. Mr. J. Reid, of Paterson, N. J., is the photographer, and to him and to his 6-in. Globe lens are we all indebted for this magnificent view. It was made about noon, and 30 seconds' exposure. We consider it one of the greatest gems it has been our pleasure to publish. The prints were made on A. S. Barber's (Hartford, Conn.) extra albumen paper by A. Marshall, Studio Building, Boston, Mass.

Salad for the Photographer.

MR. J. MUELLER, of Council Bluffs, Iowa, writes: "In these cold winter days it is a great deal of trouble to artists who have their galleries in light buildings, like myself, to keep things from freezing over night. I took a box (a large, old dry goods box), and set it up in the shape of a closet; used the top as a door; let it down in the morning; and closed it up at night. I made a hole in the upper part of the box, and a piece of tin with a hole in it also right below fastened to the box. In this I place a low, common size kerosine lamp, which I burn in cold nights. So far, I have kept my things from freezing when everything out of it was nothing but ice. If you think it worthy you may publish it."

THE News says: "At a late meeting of the Associated Arts Institute, Mr. Rejlander read a paper On the Uses of Photography to Artists, after which an animated discussion ensued. It was the prevailing opinion of the artists present that photography, except in the hands of those who knew how to use and not abuse it, would have a tendency, especially in the hands of young students, to induce idleness and a neglect of the severer studies so important to those who aimed to reach the highest ranks in art." Such mighty logic from such a mighty source must soon kill photography!

MR. RIDGWAY GLOVER says: "I am much pleased with the picture in your last issue, and was interested in your description, but will you allow me to make a few remarks to the public, and offer a suggestion to experimenters. It is of vast importance to science that an artificial light furnishes the means of photographing objects that are inaccessible to the sun's rays; and I presume no sane man can believe that any other means can be economically employed where daylight is available. The sun, depend upon it, is an institution that cannot be superseded by any other in photography. As you are aware, I shall be too busy to experiment with magnesium, but hope you will continue your experiments, and develop the capability of this new and interesting means for making pictures. And in your experiment allow me to give you a question to solve, which will determine at once the availability of this new agent. What amount of magnesium is required to produce a given result; that is, how much must be burned in order to illuminate a given space for the time required to obtain a photograph of it, equal to one taken by sunlight, that will make a satisfactory print? The answering of that question will place magnesium in its true position, and be a guide to the operator who undertakes to make subterranean negatives. I have determined to look upon photography in a practical light, and am not disposed to get into a fever about anything connected with it that cannot be made practically useful; and as the old saying, 'It is not wise to consider the fact alone without taking into account the trouble to get it,' remains true, it is equally true that it is useless to consider results alone without counting cost and trouble. Ascertain exactly what one dollar's worth of magnesium will accomplish, and its practical application will be made when it is the cheaper agent, or when the return will justify expenditure."

MR. J. L. WINNER, of Shickshinny, Pa., says: "I wish you to insert in your journal a hint which will probably be of some use. I have gained much information from your invaluable journal, and earnestly recommend it to all photographers.

"I found the other day a considerable trouble in my collodion; it was made in the way I always make it, thus:

Alcohol, ...	5 ounces.
Ether, ...	5 ounces.
Iodide ammonia, ...	50 grains.
Bromide potassium, . . .	20 grains.

"This collodion always worked satisfactorily, only it would peel off the plate, and I thought perhaps it was not dry enough before I immersed it in the nitrate bath, so I tried another plate, which I allowed to become a little drier before I dipped it in the bath, when, to my disappointment, I

found it to be flecky over the plate. There were cracks and checkers over the face, which utterly destroyed the negative. Determined to make the collodion work, I commenced experimenting. I added to one-half pound of collodion five drops liq. ammonia, and since then it has worked the most successful of anything I have ever worked.

"It may be a small item to publish, but may be of use to some one who may have the same trouble in similar instances to the one referred to. I would also say, when the collodion is old, and becomes red from the excess of iodine, that it will change it to a perfectly clear color."

J. Mueller, of Council Bluffs, Iowa, is always ready to do a kindness for every one, and particularly for the *Philadelphia Photographer*. He writes, "That photographers should be careful with their chemicals, and not leave them stand around everywhere, for, in Dubuque, Iowa, a country chap entered a gallery to have his likeness taken; in fixing his hair, he took a bottle of collodion which was standing near him, and, thinking it was hair oil (and cheap, too), used it plentifully. He thought there must be something wrong though, as his hair commenced straightening and standing on end. Of course, the artist sent him to several drug stores to get something to take it out.

"Secondly. A brother artist in Omaha, N. T., was evaporating his bath. He left it standing in the glass-room, in the dish. A lady, with three children, came in. The children's faces were covered with molasses candy or something like it. Seeing the dish, and thinking it was water, she took her handkerchief, dipped it in the solution, and commenced wiping the children's faces. After a while the children were to be performed upon; but hold on, says the lady, I have not got my children clean yet. She commenced dipping and washing again, but this time without any use; and finally she left the place crying, with three little negroes, the artist not even giving her anything to take it off."

Photographers who make their own chloride of gold will be interested in the following process, for which we are indebted to Thomas P. Shepherd, Esq., of Providence, R. I.

A quarter eagle ($2.50) contains 58 grains of pure gold. Dissolve this in ordinary muriatic acid, ½ ounce; nitric acid, 1 drachm. Evaporate to near dryness, and then add 4 ounces of water. Scrape in chalk in excess (the copper in the coin all falls down as carbonate of copper), and filter. Wash this, then filter, clean with water, and make the whole up to 116 drachms fluid. Each fluid drachm will then contain one grain of the double chloride of gold and sodium.

A talented correspondent, to whom we applied to become a regular contributor, adds to his response the following:

"*P. S.* There is nothing so inconvenient as a reputation; it is a nuisance and a bond; a delusion and a snare. I wouldn't have the celebrity some people have who write for you, for a large fortune. Think of always being obliged to 'think before you speak,' of never being able to write anything that wasn't first-rate; of always being obliged to keep at work to keep up your fame. Pickwick's cab horse, 'with the precious big pair of wheels behind him to keep him up,' would have an easy time compared to a man of 'extensive reputation.'

"All this P. S. is apropos of your suggestion to become a regular contributor to the *Photographer*, and what might flow therefrom."

In the November number of *Photographische Correspondenz*, we find a carte portrait of Herr Voigtlander, the manufacturer of the celebrated lenses bearing that name, made with his double objective portrait lens. It is a good picture, and speaks well for the lens, but we have seen much finer work made by Voigtlander lenses.

"How to make your cards *straight* and clean. Mark one side with pencil. Wet only the side thus marked. Keep the wet surfaces together, and when you mount, mount on the *wet* side. When the card comes through the machine, it will be perfectly flat and clean." So writes Mr. H. W. Boozer, of Ionia, Michigan.

Editor's Table.

To D. W. C.—We cannot see what your trouble is. We fear you are not careful enough, for the process we published we have from one of our leading photographers here, who is continually making them successfully. The "Cox" Gelatine will do. Try it again.

Montgomery & Co., Salem, Oregon.—We cannot be expected to sit down and answer all your queries by letter. We have too much to do, much as we would like to oblige you. If you "have *received* and *subscribed* for the *Photographer* for some time, and have seen no portraits," we are sure you have not read the June and December numbers for last year, both of which contain portraits and cuts of skylights, with descriptions thereof, and which will be very valuable to you in putting up your new rooms. Should you not have them, we can supply those numbers, and look for more portraits and more skylights in the coming March or April issue. Mr. Whipple, of Boston, has a light such as you described, but we do not think they are advantageous. To make the double pictures, get a Shive's Deflector, for $5, of your stock dealer. We know of no advantage in using "dry chloride of gold" for toning, and think it would be troublesome to do. Any good *thin* collodion, not too old, may be used for solar negatives. Never intensify them at all nor varnish them. We should be very glad indeed to receive the 4-4 views you offer, and will notice them.

American Photographic Almanac for 1866.—When we announce that Prof. Towler is the editor of this annual candidate for photographic patronage, we need hardly say more. Every year it is looked for and expected, and is always welcome. The present edition contains much new and useful matter of interest bearing upon photography, together with a complete calendar, useful tables and other valuable information which comes in play every day. It is gotten up very neatly, and will doubtless be secured by all of its old friends as well as by hosts of new ones. Jos. H. Ladd, publisher, 88 White St., N. Y. Paper cover, 50 cents.

Photographic Mosaics.—The success of this little book has entirely come up to, if not exceeded our anticipations. In preparing it for the press, we felt that we were getting up something that would be acceptable. The first thousand was nearly all sold before it was received from the binders. and the *second thousand* is now ready. Our subscribers have not all received it, and we are anxious they should. *We will take it back and return the money to any one who is disappointed in it.* Kind words concerning it have come in from all directions. Dr. R. Shelton Mackenzie, editor of the Philadelphia *Press*, in noticing *Mosaics* very liberally, says, "It will save much time and groping in the dark, by faithfully following the instructions thus given. It is so well executed and will be so useful, that we recommend the issue of a similar volume (not with paper cover) every year."

No photographic book of 144 pages of such matter, was ever before published for 50 cents. Sent post paid by all stock dealers, and by Benerman & Wilson, publishers, Seventh and Cherry, Philadelphia.

Mackenzie's Ten Thousand Receipts, containing new discoveries and processes of all kinds up to October, 1865. 487 pages. Philadelphia. T. Ellwood Zell, 17 and 19 South Sixth Street. To convey a proper idea of the contents of this book we should be obliged to occupy as much space as the index to our last volume, and use more words than a patient poser does in making a negative of an incorrigible child.

As a Pharaoh's serpent egg, when touched by fire, swells up and magnifies "much from little," so in turning over the leaves does this book grow and cause one to wonder how *so much* could be gotten in such a space, though very large.

Photography has by no means been forgotten, nearly eleven pages being devoted to it, under the editorship of Dr. C. W. Cresson, a distinguished amateur of our city. The matter is very concise, embracing the rudiments and treating upon all the new and useful processes, from cleaning a glass to mounting the print, and a very useful chapter on "failures and imperfections."

An equal number of pages on "*Paints and Colors*" will also be found useful to the photographer. The book should not only be in every family, but in every photographer's studio.

The Art of Coloring.—P. F. Cooper, Artist and Photographer, Phila.—This little volume seems very complete in itself, and the author seems to have covered the whole ground. It is accompanied by a model for coloring, by Mr. Cooper, who is a very successful teacher, we understand.

Magnesium Pictures.—From Messrs. Haines & Wickes, Albany, New York, we have two *carte* portraits, and a stereo of the interior of their reception-room, from negatives made by aid of magnesium light. The first portrait was made with one light only, in 20 seconds, and is quite sharp and well defined. The second trial was with *two* lights (*front and back*) and 22 seconds exposure. It is by far the best portrait we have seen by this light, and is much better than many of the sun pictures we daily see. In fact it is *almost all* that could be desired.

The stereo had 45 seconds exposure, but the light was evidently badly managed. Further experiments are being made by these gentlemen, after which we are promised a paper from them describing their method.

The Magnesium Light.—Our last issue and the pictures therein have created quite a furore upon the subject of magnesium light, and we understand that the orders for tin shades and tapers are coming in to the dealers from all directions. Much to our disappointment, however, we have not been able to further our own experiments, and have therefore nothing else to report, but we hope to have a good time with the new light in a few days, and will give full particulars in our next.

The American Magnesium Company have kindly placed one of their lamps at our disposal, and we have a new shade of our own to try. They have also sent us several new forms and sizes of tapers, and we hope to give an account of various experiments in our next, together with a cut of the new lamp, which was received too late for this number. Elsewhere will be found an excellent paper on the subject by Mr. Lea, and some remarks by Mr. Tresize. We also notice pictures received from various sources. To those we would add one of a corpse, made by Mr. J. Appleby Williams, Newport, R. I. Mr. Williams writes that he has made a group that will excel the one in our last number, and promises to send a copy, with his formula for collodion.

Indian Photographs.—From Mr. J. E. Whitney, St. Paul, Minnesota, we have received a parcel of photographs of Sioux and Chippewa Indians, squaws and pappooses. Among them we have pictures of several of those demons engaged in the terrible massacre of 1862, and who were executed in November last. One of them, "Cut Nose," is said to have murdered five men and eighteen women and children. "Little Crow," the leader of the massacre, "Wah-kau-o-zhan-zhan" (Medicine Bottle), and "Shakpe" (Little Six), are all terrible fellows, and go far to dissipate our ideas of the "noble savage," so graphically and poetically described to us by Longfellow. "Old Betts" is not very beautiful, but was very kind to some of the Minnesota captives. "Aupeta-sapa-win" is called a "Sioux belle," but is anything but lovely looking. "Hou-ye-tu-waste" is more beautiful. They are all excellent photographs, and samples of Mr. Whitney's usual work.

From J. Merrill Ordway, Newburyport, Massachusetts, we have a very fine picture of the old "Prince House," State Street, Newburyport. Those familiar with that city remember that Washington and Lafayette were at one time guests at this house. The building has been sold for a library, the fine old Linden trees are to be cut down, and the whole modernized; but our artist has secured a picture of the sacred structure before any change was made.

From J. A. Mather, Titusville, Pennsylvania, we have several stereos of the Oil Regions, among which are a view of Titusville; of the "Holmden Well," now flowing 1500 barrels a day; of the quarters of the Pit Hole Pet. Co. showing nine derricks and wells; and of the McKinney farm. They are all very creditable, as we learn they are Mr. Mather's first attempt. The last one is very fine, and a fine standard to go by.

Photographs.—From Black & Case, Boston, Massachusetts, we have a variety of fine prints, viz., "The Old Mill," at Newport, R. I.; the 14-inch gun at Fort Warren; interior of the new Cathedral at Boston; residences at Newport; and the residence of Peter C. Brooks, Esq., at Boston. The latter is one of the finest specimens of architectural photography it has been our pleasure to see. "The Old Mill," is a charming picture, telling its own tale. They are all in Mr. Black's handsomest style, and are well worthy of the aspirations of those who are working in the delightful branches of photography which they represent.

To Stock Dealers.—We offer fine inducements to all stock dealers who will aid in extending the circulation of this Journal. In placing it in the hands of their customers they will be doing themselves a favor by enlightening the trade upon new processes and improvements, which naturally create a demand for goods.

January (1865) numbers wanted. 75 cents per copy will be paid for them at this office.

SPECIALTIES.

Notice.—It will be understood that matter under this head is not to be considered as always having editorial sanction, though we shall endeavor to purge it of anything tending to deceive or mislead. Stockdealers will find this a beneficial mode of advertising, and sure to pay largely. Six lines, one insertion, $2, and 25 cents for each additional line.

NEW WORK ON COLORING.

Willard & Co.'s Cameras.—Parties desiring cameras of a very superior quality will please refer to the new advertisement of Willard & Co.

This enterprising firm proposes to make the manufacture and sale of cameras *a specialité* in future, and have just completed the most extensive arrangements to that effect. They are also pleased to notice that the valuable services of Mr. Usener have been secured, and all the cameras offered for sale will be manufactured under his personal direction.

As a photographic optician Mr. Usener has no superior, and is favorably known to a large portion of the profession who can heartily indorse what is said in the advertisement referred to.

We heartily wish for this popular firm all the success and prosperity they deserve in this new and important branch of their business, and know them so well that we feel assured that they will do all they promise.

NEW WORK ON COLORING.

Magnesium. — *The American Magnesium Company*, of Boston, offer the magnesium tapers, for photographic purposes, at $6.50 per oz. They are used by burning them in a simple tin shade that is held in the hand of the operator; they are as safe and as convenient to use as a common lamp, and give a light by which negatives may be taken as quickly, easily, and satisfactorily as by the noontide sun. Pictures of interiors of caves, of mines, of machinery, of the dead, of persons who prefer to be taken surrounded by all the comforts of their home, or who, from age or infirmity, are unable to visit the studio of the photographer, are taken without a moment's delay, whether by night or day, in sunshine or cloud. There needs no arrangement of screens or mirrors, for the photographer has the sun in his hand, and throws its rays when and where he chooses; and by slightly moving the light while burning, all striking contrast of light and shade is avoided, and a perfect effect of diffused light is produced.

Price of tin shades $2.

Magnesium in tapers, ribbon and wire, and shades and lamps, for sale by stockdealers generally, and at wholesale by the *American Magnesium Company*, No. 5 Liberty Square, Boston.

NEW WORK ON COLORING.

Important Change of Firm.—The firm of Wilcox & Graves was dissolved on the 22d inst. Mr. G. A. Chapman & Mr. Wilcox formed a copartnership on the same day, and will carry on their combined stock business at 530 Broadway, corner of Spring Street. This cannot but result in good, for both gentlemen are well known in the trade, and are sure to do a fair share of business. Their several special articles make them a leading house, and deservedly so.

Photographic Society of Philadelphia.—520 Walnut Street, Third Floor, Front Room. Regular Stated Meeting, Wednesday evening, February 7, 1866, at 8 o'clock.

Coleman Sellers, President.
F. A. Wenderoth, } Vice-Presidents.
A. Tilghman, }
S. Fisher Corlies, Treasurer,
Edward L. Wilson, Recording Secretary.
J. D. Sergeant, Corresponding Secretary,
420 Walnut Street.

NEW WORK ON COLORING.

"Young Men, Come West."—A first class gallery, doing a business of $20,000 per annum, established 1847. The *oldest* in *St. Louis;* has always been doing the best work in the city. The Proprietor, wishing to retire, offers the best *inducements* to the *right man.* Address Box 2235, P. O., St. Louis, Mo.

NEW WORK ON COLORING.

A First Class Photograph Gallery for Sale.—The advertiser offers for sale the Good-Will, Stock, and Instruments, and everything complete, of his gallery, situated in the most desirable part of Arch Street, well established (has been in operation over eight years), has a good class of custom and every facility for doing a large business. A rare chance. Will be sold at a bargain. Address, G. L. Care of Wilson & Hood, 626 Arch Street, Philadelphia.

Helion Cotton and The War Debt.—If our Government can manage to pay the interest on the National debt until 1870, by that time the principal can be met from the sales and use of *Helion Cotton*, if every photographer will lay by for that purpose his net gains by its use; such are the present prospects.

PHOTOGRAPHIC MOSAICS.

A First Class Photograph Gallery for Sale.—The proprietor wishes to retire on account of ill health; would sell very cheap. Supplied with one eight-four Voigtlander camera, one one-half Harrison, a pair of one-third ditto, one solar camera, and a large stock and furniture. For particulars, apply immediately to, or address,

C. S. Roshon,
Milton, Pa.

For Sale; A New and Good Gallery in the Town of Allentown.—The Gallery is on the third floor over the post-office, is situated in the best business part of town, and is doing a good business. Satisfactory reason for selling out. For further particulars, address

Owen Fry,
Allentown, Pa.

For Sale: A Commodious and Well-fitted Photograph Gallery with all the Appointments.—It is centrally located, has an inviting entrance and a capital light. Will be sold at a bargain. Those wishing to purchase will receive further information, by addressing

M.,
Care of American Farmer Office,
Rochester, N. Y.

Descriptive Catalogue.—Messrs. Wenderoth, Taylor & Browne have issued a beautiful little descriptive catalogue of styles and prices of their work, frames, cases, albums, &c. The cover is ornamented with a cut of the front of their building on one side, and of the splendid reception-room on the other. It is all gotten up in excellent taste as they do their work.

PHOTOGRAPHIC MOSAICS.

Chapman's Porcelain Printing-Frame.—A great deal of pains has been taken by several parties to get up a proper printing-frame for the porcelain pictures. Mr. G. A. Chapman has thus far eclipsed all the others, we think, and we believe we are not saying too much when *we indorse every testimonial he publishes* in his advertisement. He deserves great credit for his ingenuity, and for getting the frames ready for the market so soon. The prices are also low. To be had of every dealer, and of Chapman & Wilcox, 530 Broadway, New York.

New Work on Coloring Photographs Edited with Notes by M. Carey Lea, together with Hints on Lighting and Posing the Sitter. This book will be ready about the last of February. Be sure and wait for *our edition*, as it will be much larger and worth four times the English one, advertised. See advertisement herein.

PHOTOGRAPHIC MOSAICS.

Another New Developer.—While in New York, a few weeks ago, we were witness to some experiments with Mr. Miller's New Developer, advertised herein. There can be no doubt but what just such an article is much wanted, and we are convinced that it is all one could desire in that line. No matter how long the developer remained on the plate, it would not fog. Altogether it worked beautifully. While in their building, Messrs. E. & H. T. Anthony & Co. also showed us the new porcelain printing-frame invented by Messrs. Campbell & Adams. It is a wonder that the pneumatic holder had not been thought of before for this purpose. It is a real novelty.

PHOTOGRAPHIC MOSAICS.

Albums and Bookbinding.—We would call attention to the advertisement of Mr. William Flint, bookbinder and album manufacturer, 807 Market Street, Philadelphia. Mr. Flint does the binding for *The Photographer* in neat and beautiful style, and his albums are known everywhere.

Chairs And Lounges.—The prices of Knell's patent sliding arm-chairs and of children's lounges have been much reduced, placing them within the means of every artist. They are unequalled in style and quality. Beware of cheap imitations, and get nothing but Knell's. See advertisements. To be had of every stockdealer in the United States.

PHOTOGRAPHIC MOSAICS.

Mormon Views and Portraits.—From Savage & Ottinger, Great Salt Lake City, Utah, we have a panoramic view of that curious city; photographs of the great lakes and mountains adjacent, of Brigham Young's theatre, house, tabernacle, &c. &c. Also portraits of Brigham Young, Heber Kimball, Mormon women, and others; all of which are very curious, and some of the views very beautiful. The panoramic view is really very fine indeed, and is in five sections. Messrs. Wilson and Hood have been appointed agents, we believe, and advertise a stock for sale elsewhere.

Daniel [illegible]
Aug 77

THE

Philadelphia Photographer.

Vol. III. MARCH, 1866. No. 27.

ON PHOTOGRAPHIC PERSPECTIVE.

BY M. CAREY LEA.

PART I.

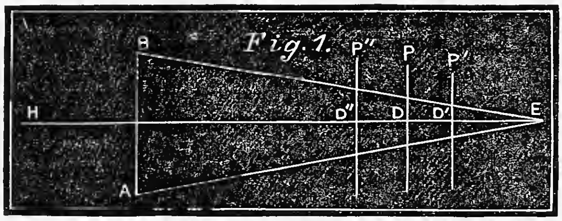
It has long been a matter of surprise to me that we have not a few plain and simple remarks within the reach of all photographers, as to the treating of perspective in photographic representations of landscapes and architecture. I can only explain it by the regrettable separation which has existed between the votaries of two pursuits so nearly akin as those of the artist and the photographer. It is pleasant now to see in England, at least, a disposition to remove these barriers by the formation of art-libraries for the use of photographic societies: a worthy example.

If I attempt to say a few words on this subject, I do it with the fear of being thought too technical by some, and too elementary by others; I therefore make the attempt with much hesitation, and only from a sense of its need. For I believe that the tendency of the present day is in some respects quite erroneous. Since the introduction of the American Globe lens, there has been a constant straining after wide angles, which, of itself, is very well, if it did not lead to tendency to use lenses of very short focus for the production of pictures to which they are utterly unsuited. The employment of a very short focus lens for the production of small and insignificant views may be pardoned, in consideration of the small value of the view when made. But when it is proposed, as in the case of Steinheil's periscope, to produce views of 8 inches by 6 with a lens of *three and a third inches focal length*, and much larger pictures with lenses of not much greater focal length, it becomes desirable to inquire what such pictures can really be worth as representations of natural scenery.

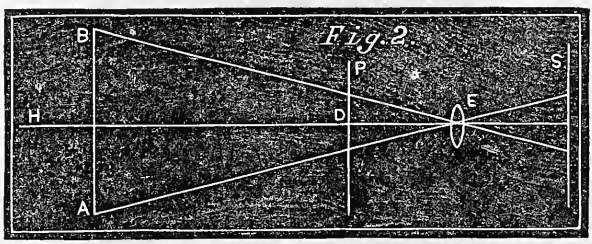
Before, however, proceeding to this part of the inquiry, I must observe that my criticism is not directed to the construction of any lens; that will not enter into consideration here, but to the misapplication of forms and principles. If a wide angle lens be used of eight or ten inches focal length, the objection is diminished. The temptation, however, to crowd a large number of objects into a small picture is so great as to be almost irresistible, and hence the popularity of these forms of lenses is so great that all the best makers in the world seem to be bending their attention to the construction of such.

To understand the influence of the focal length of a lens upon the picture produced, let us observe the considerations which govern a draughtsman in representing landscapes or architecture.

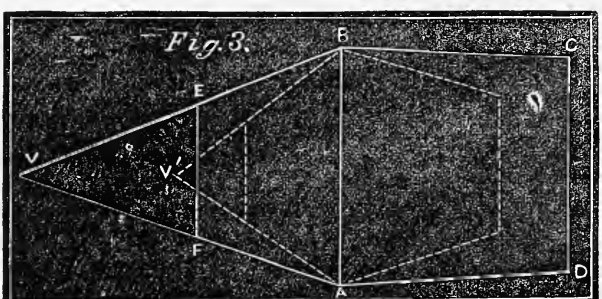
Let A B, fig. 1, represent a distant tower. The artist considers his eye as placed at E, on the horizontal line E H, and conceives a plate of glass to be placed between him and the tower at a point P (the edge of the glass plate is here necessarily seen), and he represents on his paper, supposed to take the place of the glass plate, the projections of the tower on the glass plate. The point at which the line E B intersects the plane P, gives him the position of the top of his tower, the intersection of E A, the bottom, and so on. The distance at which the plate P, shall be placed from E is arbitrary, a point to which we shall return presently.



If, now, we substitute at E, a photographic lens for the eye, the rays will pass through it, and form a picture on a screen S, fig. 2, placed at a distance equal to the focal length of the lens. Now, this image of the tower on the screen S, will be exactly the same as that which was seen on the plate of glass, P, supposing that that plate was so placed that the distance E P, is equal to the distance E S. That is to say, the character of the picture produced by a lens of a given focal length will be precisely that of a drawing of the object when the projection plane P, is fixed at a distance from the eye equal to the focal length of the lens. Consequently, and this is important, the same rules which the artist applies to the fixing of his projection plane will apply to the selection of the focal length of the lens used.



Now, the artist finds that when the position of his eye, E (technically, his *station-point*), is too near the centre of his picture, D (technically, his *sight-point*), the following consequences ensue. The upper angles of his buildings become too acute, his vanishing points come too near to the centre of his picture. Near objects become too large in proportion to distant ones, and the result produced is exaggerated perspective. For example, a rectangular building, C D E F (fig. 3), with its corner, A B, towards the operator, and which is correctly represented by the full lines, assumes the appearance indicated by the dotted ones. The vanishing point of B E, and A F, which should be at V, is brought in to V′. These are the results that follow the bringing in of the sight-point, D (fig. 1), to a nearer position, D′, and precisely the same effects result from the use of a lens of too short a focus.



On the other hand, if the sight-point be removed further from the eye, or to D″, a reverse effect takes place. The vanishing points become too distant from the centre of the picture. The proper relation between distant and near objects is lost, and the whole picture is flattened. The same results follow in pho-

tographic pictures produced with lenses of too long focus.

Perhaps there is no better way of illustrating at once to the eye the effect of various perspectives, than by observing the shape which a horizontal or inclined square surface, below the line of sight, assumes in them.

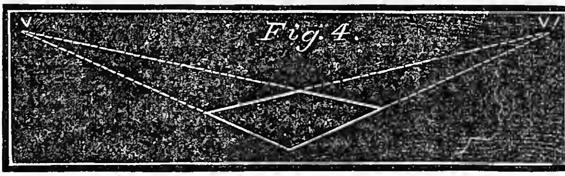


Fig. 4.

When the sight-point is properly chosen, the square assumes the shape shown in fig. 4, and the correct idea of a square seen in perspective is given. In this case the vanishing points of the sides are at a proper distance from each other, as seen at V, and V′ (fig. 4). The effect is the same with a photographic representation given by a lens of suitable focal length.

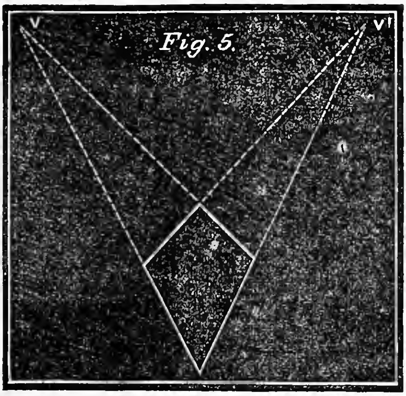


Fig. 5.

When the sight-point is taken too near, the projection no longer gives the idea of a square, but of a rhomb with its acuter angles in the line of sight, as seen at fig. 5 in a somewhat exaggerated form. Here the vanishing points V V′, are too near together. The same effect is given by a lens with too short a focus, as I think all observant photographers must have noticed.

When the sight-point is taken too far, the projection obtained of the square from a perspective, instead of giving to the eye the idea of a square, appears to be a rhomb, with its obtuser angles in the line of sight. This incorrect projection is exemplified in fig. 6. The vanishing points, V V′ are here too far apart, and the effect is the same as with a lens of too long focus. Objects in the background (as, for example, the farthest corner of the square), are drawn unnaturally forward into the foreground, and all the objects in the picture tend to be huddled together: the precise opposite to the effect produced by the short focus lens, which thrust back all the objects in the middle distance into the background. (Of course, the appearance of the square seen in perspective varies also with its distance above or below the sight line. I am here supposing this distance to be the same in all cases.) Of these two extremes, it is difficult to say which is the worst. Much depends upon individual taste; to some eyes one error is more offensive, to others, the other. I have known experienced photographers defend the short perspective, on the ground that it gave greater reality to the picture, whereas, to me it is painfully unnatural. Both defects are extremely bad. Our best means of getting at true proportions lie in consulting the works of those great masters who have best succeeded in reproducing natural effects. And the experience of centuries as to the best position for the sight-point, clearly indicates the proper focal length which a lens should have, to give truly artistic effects.

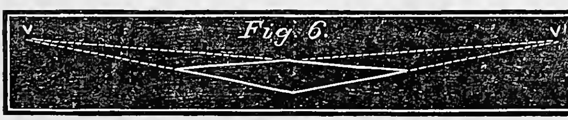


Fig. 6.

According to Ruskin, the distance of the sight-point from the eye should never be less than the distance at which the observer is likely to examine the picture. Consequently it would follow that the focal length of a lens should be about the same, for example, twelve inches. This is, however, to be modified to some extent by the size of the picture. The sight-point should always be at least as far as the greatest dimensions of the picture (Ruskin), and in pictures of less than twelve inches

in longest dimension, some reduction in the focal length may be allowable. But generally a lens of less than 8 inches of focal length cannot be expected to produce anything like a correct representation.

The canon last above quoted, also leads to another reflection, that lenses of very great angles must always produce incorrect effects. And that generally the greatest dimension of the picture should not exceed the focal length of the lens.

These considerations necessarily apply themselves more especially to architecture, because there we are more cognizant of our subject, and can most readily detect faults in proportion. But they also are applicable to landscapes and to portraiture. In a landscape, the bringing the sight point too near,—in other words, the use of a lens of too small focus, dwarfs the distant mountains into mere hills, and proportionately exaggerates the foreground. So, too, in portraiture, if we used lenses of greater focal length, say 9 inches, we should no longer have exaggerated hands and feet, or observe in groups that persons in the foreground are represented upon an entirely different and much larger scale than those a little behind them. The necessity of rapidity of action in portraiture leads to a submission to these defects, but they are none the less serious. In landscapes and architecture the case is different, and the use of unsuitable lenses has no such excuse.

In the foregoing it has been asserted, in order to avoid encumbering the explanation, that the image at S, fig. 2, of a lens, is the same as the perspective projection of the same object at P, at an equal distance in front of the lens. This is a matter which cannot be taken for granted without demonstration, and may be shown to be the case, as follows:

Let A B, fig. 7, be an object at a moderate distance in front of a lens, D E, which object we will suppose to be brought to a correct focus at A′ B′ (I have here purposely taken oblique pencils in order to avoid the deceptive regularity of lines introduced by placing the object directly in front of the lens).

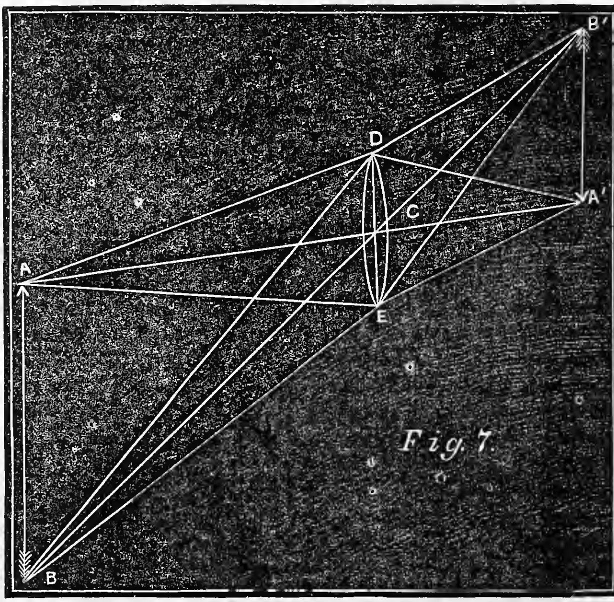


Fig. 7.

As, then, by the condition of the case, the point A is correctly focussed at A′, therefore the rays A D, A C, A E, meet at A′. But the ray A A′, passes through the centre of the lens, and it is a universal law that a ray passing through the centre of a lens suffers no deflection. Consequently, the points A, C, and A′, are in the same right line. The same reasoning holds good with respect to B, consequently B, C, and B′, are all in the same right line. As A B is parallel to A′ B′, the triangles, A B C, A′ B′ C, are similar. If, therefore, we draw A″ B″, fig. 8 (p. 69), parallel to A B, making A″ C, equal to A′ C, the projection A″ B″, will be identical with A′ B′ (reversed, of course). As the same holds good with every object in a picture, it follows that *all objects are represented upon the focussing screen precisely as they would be upon a perspective projection plane, the distance between whose station-point*

(E, fig. 1), *and sight-point* (D, same figure), *is equal to the focal length of the lens.*

It next becomes necessary to notice an exception to these general principles. So far, we have argued on the supposition that rays passing through the optical centre have been admitted to every part of the image. In certain forms of lenses this is not the case, that is to say, the working of the lens is controlled by a diaphragm, which permits the rays of no deviation (and also of small deviations), to reach only the central parts of the image.

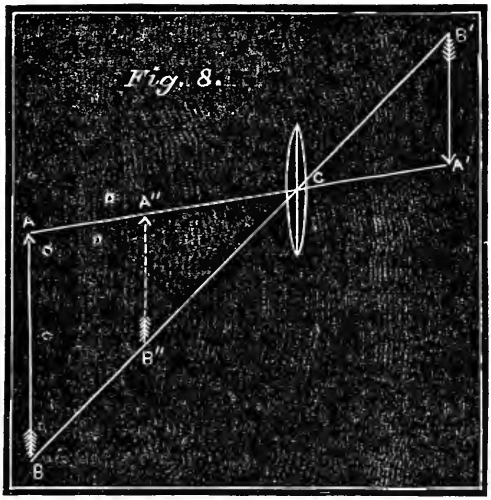


Fig. 8.

This will be better understood by examining fig. 9. A B is a meniscus lens, with its concave side turned to the object. A stop, C D, controls the passage of the rays. E F is the farthest ray on the one side that can pass through the optical centre, P, of the meniscus (which centre is exterior to the lens itself), and G H, the same, on the other. No ray can pass through the optical centre, P, and fall outside the circular space whose diameter is F H. A ray, I, which would do so, and fall at K, is cut off by the diaphragm.

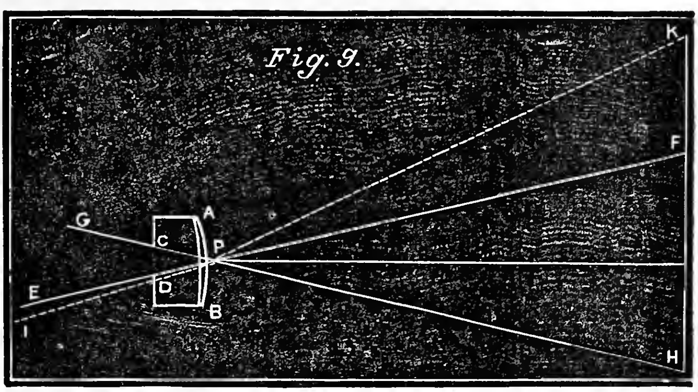


Fig. 9.

Hence, the whole of the image of such a lens, except the circular central space, F H, is composed of rays, none of which pass through the optical centre of the lens, and this circular space diminishes rapidly as the stop used is less in size. The diameter of this central space is easily found. Let f be the focal length of the lens, s, the diameter of the stop, and d, the distance at which the stop is placed in front of the centre of the lens, P (not the distance from the concave curve to the stop). Then we have:

$$\text{Diam. F H} = \frac{sf}{d}$$

The diameter of the space increases directly as the focal length, and as the diameter of the stop, and inversely as the distance of the stop from the optical centre.

If, for example, we take the case of a lens of 6 inches focal length, with $\frac{1}{4}$ inch stop, placed $\frac{3}{4}$ of an inch from the optical centre of the lens, the diameter of the circle, H F, will be two inches.

As to the space outside of this circle, it is evident that the proportionality of the triangles no longer exists there. The point K, fig. 9, is produced by the intersection of lines of light, all of which have suffered deviation by the lens, and the previous reasoning is therefore inapplicable. I think, therefore, that as respects them, nothing certain can be predicated as to the perspective projection: the relation of these parts of the image to the perspective plane, P D,

fig. 2, must depend upon the curves given by the maker to his lens. It is scarcely necessary to say that this is wholly independent of correctness of focus—the focus may be quite correct, whilst the perspective is otherwise.

In the doublet and triplet lenses, rays passing through the optical centre reach every part of the image, and the perspective is therefore much truer, and the representation of exterior objects more correct. These lenses can, therefore, be used for copying where the single meniscus cannot.

In saying that the perspective is truer with the doublet lens, I do not wish to be misunderstood. A series of triplet lenses, for example, of different focal lengths, may every one give a perfectly true perspective, though those of short focal lengths may exaggerate it, in consequence of the sight-point being brought too near; and those of very long focal lengths may err equally the other way. Still, all will give correct perspective projections, though the projection plane may have been badly chosen; an architect or draughtsman may make precisely the same fault in his drawing, although his work may be rigidly correct; nothing is commoner. But, the incorrect perspective in lenses diaphragmed in front, is a different matter: in it the positions of the different parts could not be obtained on any projection plane, except in so far as the maker of the lens has contrived to overcome these difficulties by ingenious arrangement.

We conclude, then, from the foregoing:

1. That the focal length of the lens should be the same (approximately) as the distance from the eye at which the picture is intended to be viewed. That so only can a delineation be obtained in which the relative lines and positions will be expressed harmoniously towards each other.

2. That the focal length of the lens cannot advantageously be materially less than the longest side of the picture.

3. That even when these conditions are fulfilled, the perspective of lenses stopped in front may only be correct in a small central circle, of which the size may be determined by the formula already given.

Another Experiment on the Latent Image.

A month ago I took a view upon a 7×9 plate which, after development with the collo-developer, I treated with a weak solution of acid pernitrate of mercury. The usual phenomena were exhibited; the image was first slowly dissolved off, leaving only the coating of bromide and iodide of silver; this, in a few minutes more, began to be attacked, and when about half gone, a faint positive of the view reappeared in the film, which itself soon gave way to the increasing transparency, and at last nothing but the glass and the perfectly transparent film remained.

I washed this thoroughly first with distilled water, then with filtered rain-water for fifteen or twenty minutes under the tap, and then rinsed with distilled water again; and then, with a clean wooden spatula, scraped the film off the glass into a clean porcelain crucible, and placed it over a Bunsen burner. After slowly drying the film, I raised the heat gradually to redness; portions of the film, as the heat increased, flashed slowly off like wet gunpowder, and at last it was completely consumed, leaving *no ash whatever behind:* a slight yellowish stain about a quarter inch long, and a sixteenth wide alone remained. This stain I treated with chlorine water, without producing any change in its color, and next with ammonia and various acids successively, but without any visible effect whatsoever.

Thinking that this experiment indicated very strongly that no salt of silver remained behind, after subjecting the film as described to the solvent action of the acid pernitrate of mercury, I communicated the above to Mr. M. Carey Lea, and at his suggestion tried this further experiment.

I coated, exposed, and developed successively seven 7×9 plates, with the same bromo-iodized collodion, and, avoiding purposely the collo-developer, used a plain iron developer, the same for each; placed them successively (after thorough washing in distilled water) in the same bath of acid pernitrate, and dissolved out each image to perfect transparency, the same phenomena being exhibited as narrated above, and then

washed each as carefully as before. On one of the transparent films I then redeveloped the image with nitrate of silver solution and the same iron developer, in great perfection, with one application only of the nitrate and developer. This I did, in order to be assured that the collodion I used was capable of yielding a film, susceptible of redevelopment after being exposed to the pernitrate.

The remaining six films I scraped off with care into a beaker, and added about an ounce and a half of distilled water and a small bit of pure zinc. I then added pure dilute sulphuric acid, and kept up the action for a week, by adding a few drops additional, from time to time, until the zinc was wholly dissolved.

At the end of this time I added 20 drops of pure nitric acid, and gradually raised the heat to boiling. No change in the appearance of the liquid or films took place under the above treatment.

I now filtered off about four drachms of the liquid, diluted slightly, and added to this two drops of dilute hydrochloric acid; not the slightest cloud or opalescence was formed, or any change whatsoever. I then repeated this experiment, after slowly evaporating the liquid to about a quarter of its original bulk, but without any effect of any sort. The transparency of the liquid continued *perfect*.

So far as this mode of investigation will indicate, it is therefore evident, that no silver salt was present in a half dozen 7×9 films, on each of which an image could be redeveloped after its treatment to perfect transparency by the acid pernitrate of mercury, and this experiment also confirms the first.

Now, here is the film, apparently reduced to pure pyroxylin, and apparently deprived of all substances capable of exercising any chemical action on the silver and iron developer whatever, and yet, to it has been conveyed a power to cause the particles of silver as they fall from the developer to assume the form of the picture to which it has been exposed in the camera. What is this power? It is a persistent power, for the transparent film on which it is impressed may be dried, and the image be redeveloped the next day by the usual mode of developing tannin plates.

It is to be observed that these experiments give only *negative* results. They must therefore be repeated many times, and with every variety of circumstance, and by different observers, and with the same results, in order to produce a high degree of conviction.

S.

PROVIDENCE, January 14, 1866.

THE SISTER ARTS.

BY REV. H. J. MORTON, D.D.

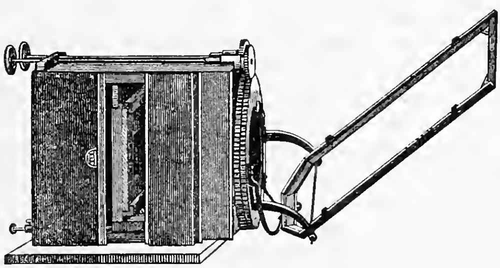
WE observe with much surprise that a sharp contest is going on abroad, between the advocates of Painting on the one hand, and of Photography on the other. The two pursuits are regarded as *antagonistic*, and sharp things are said by the friends of each concerning the claims of the opposing art. To us it seems obvious that photography is the handmaid of painting; while to painting, or rather to the special skill, taste and genius of the painter, the art of photography must look for all the improvements which are not simply scientific or mechanical. As well say that *printing* is antagonistic to *writing*, as that photogrophy is antagonistic to painting. When the press began to pour forth its torrent of repetitions of the same volume, no doubt the work of the scribe and copyist was greatly abridged. But still men wrote, and even now write as much or even more than ever, and the profession of the scribe is anything but obsolete. So of painting and photography. The vast improvements made in the latter art; its fidelity and amazing facility of rapid reproduction have multiplied landscapes and portraits beyond all calculation. Ten thousand men, women, and children have their likenesses taken by photography, where one had a portrait painted in olden times, and a myriad of country seats and buildings and rural scenes are produced by the photographer, which the painter would never have been called upon to put on canvas. But still, artists of ability in each department thrive, and historical painters, and landscape painters, and marine painters, and even portrait painters find abundant employment. The "Niagara" of Church is not less valued, because there are a thousand views of the "Falls" to be had in every city! A Moran, a Lewis, a Hamil-

ton, or a Richards is quite as highly prized as if sea-pieces and landscapes were not to be purchased in the store of the photographic printseller, and though portrait and miniature painting have been affected by the introduction of photography, still any artist of real ability in these branches will find his easel always supporting a canvass, and his chair always occupied by a sitter. Our annual exhibitions show no diminution of well executed paintings. Our public sales show no reduction in prices paid for the products of the brush; and thus looking at the evidence furnished us by facts, we say that the two arts are not antagonistic. It would be strange, indeed, if they were. The one creates, the other copies. The one calls for the exercise of imagination, the other is content with the results of taste and skill. In a good portrait, in a good landscape, much more in a good historical piece, there is the exercise of imagination. The face is not the face which everybody sees, but which the painter sees and enables others to recognize. The same scene in nature, be it mountain pass or pleasant plain, however faithfully rendered, will, if painted by two artists of original genius, present totally different aspects. There are pictures of Turner and Stanfield of the same locality taken from exactly the same point, yet they are very unlike! You recognize the scene at a glance, but in one picture the lights are so arranged, and the details so treated that it seems another landscape. Now, photography does not attempt anything of this kind. It does not deal with fancies, but with facts. It cannot modify. It obeys the lens, not the eye. It can copy with an accuracy which the hand would in vain attempt to imitate, but it must submit to the iron law of "things as they are," without liberty of alteration. But though travelling along different roads, with different aims, and under different influences, the two arts come together and mutually aid each other. The studies of feature, form and foliage, of rock masses and richly sculptured architecture and projected shadow, made by the photographer, are invaluable to the painter! Step into the studio of any artist. Here is one occupied by a painter whose groupings of cattle and representations of raids, full of men and horses, have established for him a reputation which is enviable. All around his walls you will see *casts* of living cows and dead guerillas. Studies in color of goats, and dogs and donkeys, and dappled steeds, but beside them fine photographs of the same or similar subjects, and he will tell you that these last are of great use to him. He cannot keep a cow in his closet to consult, when the shape of a horn or the moulding of muscle is in question. Nor can he conveniently accommodate a goat, and donkey and flock of ducks in his studio, but he can have scores of photographs which give everything of the donkey except his bray, all of the goat except his pungent aroma, and all of the ducks except their noisy dabblings. Pass into this room of another artist. He has made a name of note by his exquisite delineation of natural scenery. His walls, too, are full of studies in color made by his own hand on still summer-days, and by calm flowing rivers. They show many hours of patient toil. But here, too, are plenty of Moran's matchless photographic "bits" of wood and water, of rock and foliage made in an instant by the unerring lens, and again the artist will tell you they afford him most valuable assistance. So of painting in other departments of the art. Now, on the other hand the painter's eye for form, and grouping and composition generally, is essential to the photographer, if he expects to produce works of high merit, and the study of good paintings, and of the rules by which they are produced, will be his best help towards executing good photographs; I mean, of course, not merely mechanically good but artistically excellent. Color is another element which at present must make painting and photography distinct and yet cooperative arts. If the photographer wishes to impart in the highest degree the charm of color to his prints, he must resort to the painter. The painter, if he wishes to secure a rapid and perfect picture on which to exercise his skill as a colorist must depend upon the photographer. In examining lately some of the finished porcelain portraits from the establishment of Messrs. Cremer & Dillon in Eighth Street, and from Messrs. Wenderoth, Taylor & Brown, Chestnut Street, we were struck with the exceed-

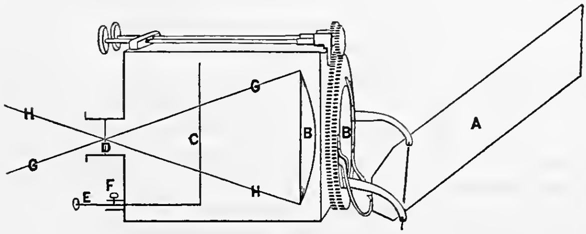
ing beauty which resulted from the combined skill of the painter, and accuracy of the photographer. The most accomplished artist in ivory could hardly equal the results secured by the help of a photographic picture on which to work; certainly not with anything like the same accuracy and the same rapidity. While, of course, the photographer, without the artist's skill, will fail to group or pose his figures properly, and lose all effects, so magical, of flesh tints and tones of color in hair and eyes and all accessories. The two arts are not antagonistic but cooperative. We hope their respective votaries will realize this fact, and work together harmoniously and with mutual encouragement.

GALE'S PATENT SOLAR CAMERA.

Much trouble has been experienced in procuring a proper instrument for enlargements at a reasonable expense. Nothing can be much better for this purpose than Mr. Roettger's arrangement for large and fine work, but its machinery and size increase the price very much, placing them beyond the reach of many. Gale's Patent Solar Camera covers this objection, and those who desire an instrument for large work for a reasonable sum may now obtain it We append a description of it and its merits below, with diagrams of the same.



LONGITUDINAL SECTION.



A. The Mirror. B. The Condensing Lens. C. The Negative. D. The Camera tube and Lens. E. A Rod for Adjusting the Negative. F. A set Screw. The lines G G and H H represent the Cone of Light thrown by the Condensing Lens.

This apparatus has been in successful operation in the rooms of some of the most distinguished artists for several years, and has been received with universal favor by all who have used it, and comes to us with numerous testimonials from those who have used it.

The castings and machinery for adjusting the mirror are the most approved and ingenious arrangements in use, and a picture—from the smallest to life size—can be made without any change in the instrument. The novel arrangements at the top for working the mirror are worthy of special remark, and give the mirror almost any position desired.

It is perfectly simple on all its parts, and for durability cannot be surpassed.

It may be used on the roof or inside of a building, at the option of the artist, and is so firmly arranged that it is capable of resisting the highest wind.

For further particulars address Messrs. Willard & Co., 684 Broadway, New York, Sole Agents; or send for a circular to your stockdealer.

We have ourselves carefully examined it, and cheerfully add our testimony to its value to those whose testimony has been made public. In a letter from Mr. Aug. Marshall, he speaks very highly of this apparatus, and adds that it is particularly well adapted to use with his development process published in this Journal last year.

PRINTING WITH A LENS.

At the request of a friend, we have been induced to offer you for publication our formula for printing vignettes, viz.

The negative is made in the usual way, with the exception that you use a cut-off in front of the instrument. This is made of a simple piece of card-board cut in crescent shape, and set in an iron head-rest, so it may be easily adjusted. By this means you cut off the figure at any point desired.

The negative is then placed upon a common printing-frame, so arranged that you can easily examine your print. If it is a common card vignette you wish to print, take a plain 4-in. lens, set it firmly in the centre of a piece of heavy paste-board about a foot square; this will shade your paper, except where you wish to print. Then hold your lens (in the sunlight) at a distance to form a circle upon the negative about an inch in diameter, moving it so as to scatter the rays, blending the background about the head and shoulders as you desire, and at the same time printing the face evenly, taking care not to burn the print. For larger negatives, use a lens in proportion as above.

Advantages of the above Method.—By printing quick before the paper changes, you get a more brilliant effect. You can bring out a light forehead, or leave the hair light for coloring when desired, and a greater variety of effects can be produced than is possible with a block.

Manchester Bros. & Angell.
73 Westminster Street,
Providence, R. I.

RESEARCHES ON THE LATENT IMAGE.

BY M. CAREY LEA.

In studying the origin and nature of the latent image, it recently occurred to me that no confirmation of the physical theory could be more striking than that which would result, if it could plainly be shown that a purely physical cause, independently of light, was competent to control development; and that if this cause was not merely physical as distinguished from chemical, but also purely mechanical in its nature, there would result an inference which the advocates of the chemical theory would find it exceedingly hard to countervail.

I, therefore, subjected this to trial, and succeeded almost at once in obtaining results that certainly are very different from anything heretofore published, and which at least prove that a physical cause may be amply sufficient to impart to a sensitive plate the capacity to afford an image under development.

As I before said, the form of physical force which I selected, was mechanical, *simple pressure*, and this, I find, modifies iodide of silver in such a way, as to make it capable of receiving a development. The following are the principal experiments, selected out of all that I made:

Experiment 1.

An orange-wood ruler was selected, in which the letters composing the word "Sorrento" had been carved in open work, cut entirely through. A plate was sensitized in the usual manner, and then without removing it from the dark-room, the ruler was laid upon the sensitive film, and whilst the glass rested on a firm support, the ruler was powerfully pressed down upon it by the full strength of the two hands, and kept so for twenty or thirty seconds.

The ruler was then carefully lifted off, and the plate developed with an iron developer. *The word immediately became visible.*

Precisely as I expected, it was the parts which had been pressed that received the silver deposit. Had the reverse taken place, it might have been said that the ruler carried away a portion of the silver solution, so that the letters were left with more nitrate on them; or that the faint light of the dark-room had acted on the open part under the letters, whilst pressure was applied. But even these futile objections cannot be urged, when it was precisely the portions that had been covered, which were darkened by development. Repetitions of the experiment gave the same result.

Experiment 2.

A piece of letter paper was taken, on one side of which some words had been printed, so hard as to show the lettering through—

that is, the back of the paper was slightly raised by the pressure of the type on the other side. This paper was laid on the sensitive film, printed side up, that is, away from the film, and the finger was drawn several times over the lettering, with a moderate, steady and careful pressure. The paper was then removed, and an iron developer applied. Presently *the lettering came out, plain and distinct*, on the iodobromized film, though the type was small.

It will be observed that the printing was not in contact with the film, so that no argument as to different natures of surfaces can be applied. And as the paper was sized and thick, and the printing old, it cannot be contended that its influence passed through the paper. The case was therefore, as before, one of simple pressure. The lettering came out dark, that is, just as in the previous case; it was the portions which received the pressure, that took the deposit of silver.

Experiment 3.

This experiment was perhaps even more striking than the foregoing. An embossed card with raised lettering on it, was placed face downwards on the film (sensitized in the usual way), and was gently and steadily pressed down by drawing the finger over the back. The application of a developer *produced a clear and distinct image of the lettering*. A part of the film adhered to the card, and came away, but a very much larger part remained on the glass, and exhibited the results just mentioned.

In this case, as in the former ones, it was the projecting portions, the lettering, which received the deposit of silver. Wherever the pressure was greatest, there came the deposit.

I need scarcely say that these results require some little care and nicety in manipulation, to obtain them clearly and plainly, though not an exaggerated care, and they generally succeed at once. A strong developer is required, which must carry its action so far as to veil the plate. The lettering, marks, &c., then come out clearly and plainly, and the plate may be fixed with hyposulphite in the usual manner. I have developed both with ordinary iron developer, and with collo-developer.

No proof, I think, can be more striking than this, of the capacity of a purely mechanical cause to give rise to development. In every case, it will be observed that the heavier deposit of silver followed where the pressure had been, indicating that in some way, that pressure had predisposed the film to receive the silver. In other words, a true latent image had been formed by a purely mechanical means, just as truly as by the agency of light, though less powerfully.

All objection, therefore, made to the physical theory as furnishing an explanation insufficient for the effect, is removed by these facts.

These experiments, however new in themselves, are but the logical induction from what I have published before on this subject. I have always been struck with the phenomenon of the deposit of a precipitate, following the stirring of a glass rod, and making evident all the lines which it had traced, and have mentally compared it with photographic development, as often as such a result happened in the course of my chemical investigations. The phenomenon of development, as I have before said, I regard as one of simple precipitation, which elects to form on those parts that are most predisposed to receive it. In the case of the iodide film, it is those parts which have received one sort of physical influence; in the case of the glass sides of the vessel, it is those parts which have received also a physical influence, but of a different description.

I cannot but think that these experiments will afford a most telling argument in favor of the physical theory, and one which its opponents will find it difficult to explain away. Here is no possibility of reduction, no possible production of metallic silver, or of subiodide, no possible elimination of iodine, and yet a developable impression is produced, which comes out plain and strong under the action of a developer.

It is almost superfluous to remark that the foregoing experiments may be almost indefinitely modified, the one essential thing

only, seeming to be *pressure*. Marks made, probably, by any hard body, may be brought out by the development, always the part *receiving the pressure* becoming darkened in the development. A coin may be fastened to a stick of sealing wax (a silver or gold coin should be used for obvious reasons), and pressed upon the film. In modern coins, all considerations of beauty are sacrificed to that of "piling:" that is, coins must make a steady pile, and to do this, their edges must be raised higher than the design. Consequently, it is difficult to get anything on the film, except the image of the rim. I have, however, succeeded in getting part of the design, by using pressure enough to make the ring cut through the film on one side—the design on that side then pressed against the film, and made itself evident in the development. This experiment is, however, far less satisfactory than those previously described, which, in fact, leave nothing to desire in distinctness of result.

Evidently these experiments may be greatly varied by ingenious experimenters, and the same principle be exemplified in many other curious ways.

COLLODION WITHOUT BROMIDES.

THAT most respectable. useful, and excellent paper, "The Scientific American," seeing how badly we and our friends have been dosed with Bromide, how we choke and turn sick at swallowing the bitter pill, kindly intercedes and offers us consolation in the following process for "Photographic Collodion without Bromine."

"For the benefit of photographers—professional and amateur—who do not wish to use bromide in collodion, I am induced to give the following formula which I have used successfully for some years:

"Take of plain collodion 6 oz., iodide of cadmium 18 to 30 grains, iodide of ammonium 12 to 20 grains; shake well, and let stand to dissolve and settle.

"Then take plain collodion 2 oz., and chloride of calcium 20 to 30 grains; shake well, and let stand to dissolve and settle.

"For use, add a small portion at a time of that containing the chloride to that containing the iodide, until the half tones are such as desired.

"Any other soluble chloride may be used, as also other iodides.

"I also take, say a couple of ounces of collodion already excited, and add a very small piece of phosphorus, about half the size of a pea; and of this two ounces, when the phosphorus is thoroughly dissolved, I add about from half to a drachm to the collodion I am using, which has a considerable effect in assisting reduction.

"In using this formula the beauty of the result depends:

"First, Upon the materials of the collodion being good, and the collodion itself of the proper thickness.

"Second, The iodides being of good quality, and the quantity in exact proportion to the thickness of the collodion, a thick requiring more and a thin less.

"Third, A careful proportion of chloride to iodide, which must be determined by actual experiment.

"Fourth, An equally careful addition of the collodion containing phosphorus, to that already excited and being used.

"Fifth, A proper regard to the time of exposure, light, developing, &c.

"I rarely strengthen with anything except by a 20-grain silver solution, and redevelop with iron. I do not use my developer too strong, and it is very seldom I have to even sulphuret my negatives.

"J. J. CLARKE,
"No. 481 Canal St , New York."

This might seem a very plausible process at first, and well worth placing before our readers, but as some of them might not understand the meaning of such terms as a "small portion," "proper thickness," "in exact proportion to the thickness," "a careful addition," "proper regard to the time of exposure," &c., we wrote to Mr. Clarke for an explanation, and as he had "used successfully for some years" this process, asked him to please explain these terms to us, and if possible, to make the process more plain, and give us the proportions which his experience had taught him were the best. To these queries we received the following very kind reply, which must assure us of the author's earnest purpose to benefit the craft.

His letter is rather long, but as the subject is an interesting one to our readers, they will no doubt read it with interest, and profit to themselves.

New York, January 30, 1866.

Mr. E. L. Wilson.

Dear Sir: I reply with all possible despatch to yours of the 29th, because I am desirous that every one should be enabled to dispense with the Bromides, at a time when such an abominable extortion is sought to be imposed in the shape of a license, by the holders of the Cutting Patent. I would willingly make everything so plain that "he may run that readeth it," but in the sense in which you use it, judging from the queries following it, I am afraid I must somewhat disappoint you in my answers, as my experience teaches me that it is impossible to give a formula which in its results shall be as sure as that two and two make four.

Firstly, then, in reference to plain collodion. I have bought all kinds of cotton, ether, and alcohol, and found them all kinds of qualities. Being subject to great annoyance from this fact, I concluded that those who were largely engaged in manufacturing it, and had a reputation to lose, would be more likely to obtain pure materials than myself, who bought in small quantities. I now, therefore, buy my plain collodion of Anthony, and find it to suit me; sometimes I add a little cotton if not thick enough, and on the other hand, ether and alcohol in equal proportions, if too thick. To judge of this, I give the bottle a slight shake, and I can tell the body of it by its vibration.

Secondly. In iodizing I commence with 3½ grains of iodide of ammonium to the ounce of half my collodion, and 6 grains of iodide of cadmium to the ounce of the other half, which stands thus:

Plain collodion,	6 oz.
Iodide of ammonium,	10½ gr.
Iodide of cadmium,	18 gr.

Now, if these iodides were just made, and quite pure, this would probably be enough, but I seldom find it so; I therefore coat a plate, look at it when it comes from the bath, and if it appears sufficiently full, I try a picture with it, and examine that; if upon examination there is not enough, I add a little more, and so on.

Thirdly. After supposing my collodion sufficiently iodized, I add a small quantity of the chloro-iodized collodion, say a drachm to two ounces. I then try a picture in the following manner: I take a white plaster bust of Shakspeare, and surround the shoulders with my old black velvet focussing cloth; if, upon trial, the lights upon the folds of the velvet are sufficiently distinct, at the same time that the detail of the white face of the bust is but very slightly overdone, I conclude it is about the thing that I want. If there is not sufficient contrast, I add a little tincture of iodine, or a little more iodized collodion; on the contrary, if too much contrast, I add a little more chloro-iodized collodion.

Fourthly. In adding the phosphorized collodion, add but a very small quantity at a time, and let it stand for at least a day to see the result. The rule I go by is this: if the collodion is new, and of a pale color, I slightly deepen its color by tincture of iodine; I then add as much of the phosphorized as will let it permanently remain a golden yellow, and as age deepens the color again, I add more, and so on. If the collodion is already deepened by maturity, the addition of iodine is unnecessary. I could write whole chapters on the management of collodion derived from experiment, in which disappointments of various kinds have occurred, to be succeeded by ultimate triumph.

I perceive I have omitted one proposition in your second query, namely, the difference between the positive and negative. The only difference I make is that the body of the collodion should be a little thinner for the positive.

Fifthly. I presume the exposure is about the same as that of the bromo-iodized.

Sixthly. For developer I take 2 ounces of iron, 16 ounces of water, and dissolve.

On using I add 3 drachms of acetic acid to 2 ounces of solution, for positives, and for negatives, I add 2 drachms of acetic acid and 1 ounce of water to 2 ounces of solution. I vary these according to the weather; when it is cold, more iron, and less water and acid may be used. I believe a little gelatine in the developer is very good, but having only just commenced using it, I cannot

speak with that degree of certainty which I should like.

I hope these explanations, in connection with the formula in the "Scientific American," may be satisfactory, and I shall be happy to give any further information you may desire.

Yours, respectfully,
J. J. CLARKE.

LECTURE ON PHOTOGRAPHY.

BY COLEMAN SELLERS.

First Lecture, continued.

THE camera is easily understood. I shall use in my illustration of it this piece of apparatus kindly loaned to me by Messrs. Wilson & Hood. This is the photographic camera alone; it has not yet had the lenses attached to it. It is, as you observe, nothing more or less than a box, or rather two boxes united by a square bellows, like the bellows of an accordion. This bellows allows the box to be lengthened or shortened, yet excludes all light. The front end of the box is plain, and is intended to receive in a hole cut in the centre, the photographic lens. The back of the box (of the dark box or chamber—camera obscura means dark chamber) is provided with a closely fitted frame, containing a sheet of finely ground glass, with the ground or rough side toward the inside of the box. This glass is intended to receive the visible image of the object to be photographed. The frame of the ground glass is hinged to the camera in such a manner as to allow it to be swung to one side, thus, and in its place can be inserted the plate-holder. This plate-holder is a thin box of the same size as the frame of the ground glass. It is provided with a door or shutter on one side which can be opened to insert the sensitized plate. The plate, when in the holder, rests on glass corner pieces, and when the door is shut, a spring upon the door presses on the plate, and holds it firmly up against the glass corner pieces. The other side of the holder is provided with a sliding door made quite thin, fitting so as to exclude all light, and capable of being drawn out entirely, when the holder is placed in the camera. This holder is so proportioned that, when put in place of the ground glass, the sensitive film of the prepared plate will be on the same plane, or at the same distance from the lens, as was the ground side of the ground glass, when the image was shown the clearest or the sharpest as it is called. This camera, you will observe, is provided with a rack and pinion and also with clamping screws, the use of which is to enable the operator to extend or contract the length of the camera at pleasure, and to clamp it fast at any fixed position or length. This particular kind of camera is usually called bellows camera, from its peculiar mode of extension. Some cameras are made of wooden boxes, sliding into one another, just as the joints of a telescope or spy glass slide into each other. Such an arrangement is not so convenient as the one I have shown to you. In all cases the box must be well blackened on the inside with some dead black varnish or paint. I mean with a black varnish which shall have no polish. This is to enable it to absorb all light falling on the sides within the box, and preventing such light from being reflected to the sensitive plate.

There are a great many kinds and sizes of cameras made. Some are especially adapted to use in the galleries for taking portraits. Others are intended for landscape purposes. Those for the latter purpose are provided with a sliding board in front; to this board the lenses are attached, and can be thus raised or lowered. The object of this adjustment will be explained after awhile. The camera in use, must rest on some kind of stand. For field work, a tripod is used, somewhat like a surveyor has to rest his instruments on, made, however, as light and yet as stiff as possible. The camera is attached by a screw to the top of the tripod, and can be turned in any direction, moving on a horizontal plane. In the photographic galleries a camera stand is used, made quite strong and heavy; it is provided with means to raise and lower the camera, also to tilt it to any required angle. The one upon which this camera rests has these various adjustments, and has been loaned to me by Messrs. Wilson & Hood, who recommend it as cheap and efficient. Having thus explained the camera, I will now show you how the image is formed in it.

Various transparent substances have the power of transmitting certain rays, and obstructing others. Thus a solution of iodine will obstruct all light rays, and allow heat rays to pass.

It was through this substance that Professor Tyndal allowed heat from the electric lamp to pass into absolute darkness, brought these rays to a focus, and allowed them to fall upon a sheet of platina foil. The heat was so intense that the foil would glow with a white light; he allowed them to fall into his own eye, and showed that the heat rays did not harm the eyes at all, being absorbed by the aqueous humors of the eye, thus failing to reach the delicate retina beyond, and producing no sensation of light whatever, yet on taking away the eye from the focal point, and hanging a piece of platina foil there, it instantly became red hot. A dark blue solution will shut out light, and allow actinism to pass quite freely. A yellow glass will admit light, so far as it is an agent of seeing, quite freely, yet will not allow a single ray of actinism to pass. Many photographers avail themselves of this property, and glazing their glass-rooms with blue glass, they shut out the glare of light yet admit actinism freely, while the room in which they prepare their sensitive plates, and develop them after exposure, is glazed with yellow glass, and is often much lighter than the picture-making room. All objects in nature are so constituted as to either absorb all the rays of light or to reflect them all, or to absorb some, and reflect others. What looks black absolutely, absorbs all the rays, white objects reflect them all, colored objects reflect only the ray of color by which we know them, and absorb all the others; this may be made manifest in a striking manner by a simple experiment. I have here a red cloth; notice the *shade;* it is now illuminated by the various gas-lights in the room; the rays of light descend upon the cloth; it absorbs the different colors except the *red*, and thus red is the only one which reaches the eye. Now, turn down the gas-lights a very little. Still it is red; it still continues red. It seems red so long as we have light enough to see it at all. We will now furnish you with another light, one which has no red rays in it at all. Then notice the effects of it. I light these burners which are so prepared as to yield only yellow light. Now, we have a light with no red rays. Look around you; so far as it is light which enables us to see, we have plenty of it. You observe, however, that all the bright colors have gone, and sombre grays have taken their place. The color of this cloth seems different. The cloth has not changed its texture, but we are not illuminating it with the light which would enable us to distinguish its color. An *old* gentleman, writing to me some time ago, said, "Some people call me *old*, and say my hair is *gray;* in some kinds of light my beard and hair do look gray. This is especially so in gas-light, but when you put out the light, then it seems of its original color,—quite black." The color of his hair being dependent upon the light, and not upon the object. What is true of colored light is true, also, of actinism. It, too, is reflected from all objects in various degrees of intensity. As the actinic rays do not correspond with the other colors (you noticed where the yellow was, there were no actinic rays), so those colors which reflect the yellow absorb the actinic effect, *as* for instance, *yellow* dresses. Many a love of a dress has behaved most shabbily, when posed for its picture. I wish you to bear in mind the distinction between light and actinism; it is very important in our consideration of the lenses used in photography. If light fall on a very highly polished surface, as a mirror, obliquely, it is all reflected in one direction, and the surface of the mirror will appear black. If you have a plate of silver which has been frosted, it looks beautifully white; but when this same surface has been polished down, it becomes black; polishing gives it the reflecting power. When the light falls on a sheet of white paper, it seems white to all of you, or if red, it seems *red* to all of you. This fact is of importance, and should be well understood. The paper is rough; it has thousands of little projections all reflecting light, but reflecting it in every direction, so that the light, instead of being reflected in a mass to one side, as in the case of the mirror, it is scattered in every direction, some rays entering your eyes, and some entering my eyes. This kind of reflection of light is termed dispersion.

In nature the light rays falling on all objects, are thus scattered, and the few rays which reach our eyes are what enable us to see or distinguish objects, for they make in the back part of the eyes charming little pictures of the scenes spread out before them, and the optic nerve conveys to the brain the detail of these pictures. With these light rays are also scattered the rays of actinism, and we must arrange something like the eye which shall be able to receive the image, and make it permanent. This was done so far as a visible picture was concerned, long before photography was thought of, by one Porta, a Neapolitan, in the sixteenth century. He invented the camera obscura or dark chamber; and the camera obscura of that day is the camera of the modern photographs. Porta made it as a toy, or at best a means of presenting to the eye of the painter the picture he desires to paint, drawn by light on a flat surface. Photography gives us the picture in all its beauty of form and modulation of tone, but is as yet powerless to fix the colors, or what we know as light. It gives the image so far as the modulation of tone is concerned, the blacks and whites and the *grades* of shading. It enables you to distinguish the shape, but gives nothing of the effect of light, nothing of the beauty of the landscape, none of the charming colors.

(To be continued.)

The New White-enamelled Ferrotype Plate.*

As the curiosity of some of the members has perhaps been aroused by the mentioning of a new invention called the white-enamelled iron plate, I thought it might be of some interest to them to hear something more about it.

About six months ago I made experiments to produce white enamel of not vitreous substances, for photographic purposes, upon plate glass, to take the place of the opal glass, and extended these experiments to the black-enamelled Ferrotype plates. I succeeded in both as well as I could wish, but comparing these plates with material now in use, I could not see any advantages to be derived therefrom, but thought them in many respects so inferior that I dropped the matter. I was somewhat surprised when about four weeks ago Mr. V. M. Griswold, the manufacturer of the Ferrotype plates, called upon me to show me something new, when I beheld some photographs taken upon white-enamelled Ferrotype plates. After examining them, I felt astonished how anybody could go about showing such poor work as the results of a new invention. A common photograph on plain paper is a marvel compared to those shadows of pictures. They were the flattest, blue-gray things I have ever seen.

I then got out some of my experimental plates to compare them with those of Mr. Griswold, who could not help but acknowledge their superiority over his own.

Before bringing out anything new, we should always be sure that it is superior to what has been in use, but in most of these new inventions the inventors have only the patents in view, and seem to think that when the patents for the United States, England, or France are obtained, all is right, and generally these inventions are heralded to possess properties of which I judge the inventors have very often neither experience nor knowledge. So Mr. Griswold praised the adaptedness of these plates for coloring, when there is perhaps no worse material to color on than a collodion film. Again, it is said, they do not break like glass; but when they fall, they may bend; then the enamel will crack off, and there is no material that is more easily scratched and injured than this enamel, and more difficult to repair, and to judge by appearance and touch, the plates of Mr. Griswold seem to be prepared with the same material as mine.

Again, they are easily cut for lockets; as if albumen paper could not more readily be cut, and has no enamel that will break off around the edges. Whoever expects that such plates would displace opal glass, does not know that the great point of beauty in fine opalotypes is their exquisite delicacy and softness, attributable to the translucency of the opal glass, which cannot be produced on anything else, not even on what is called

* Read before the Philadelphia Photographic Society, Feb. 7, 1866.

the flashed glass. Paper being, to a certain degree, translucent, will give softer prints than these iron plates.

For those who like to satisfy their curiosity in regard to the merits of these iron plates, I give the results of my experiments.

Take a Ferrotype or glass plate properly cleaned, and coat it first with albumen, 1 oz.; water, 5 oz. Then add so much of finely ground (in alcohol) precipitated white chalk (called Spanish white) to plain collodion, as will make a covering just so thick, that the black of the plate will not shine bluish through it, and pour it on as you would sensitized collodion, but care must be taken to avoid lines. Before coating, the collodion should be well shaken, and then set for a minute, that the coarser grains may go to the bottom. When this coating is perfectly dry, coat with 12 parts of albumen and 8 parts of water, adding 2 grains of sal ammoniac to each ounce of albumen and water, then sensitize in a 70-grain bath of ammonio-nitrate of silver for one minute, then fume, print, and tone like an ordinary albumen print. Before coating with the salted albumen, a little distilled water should be poured over the collodion surface to expel the air from the pores. Or take chloride of silver collodion, add to it the ground precipitated chalk, and coat the plate which has been coated previously with thin albumen, print and tone as usual.

The results of this last method are not as brilliant and fine in tone as the first mentioned, but the manipulation is more easy.

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The Students' Practical Chemistry: A text-book on Chemical Physics and Inorganic and Organic Chemistry. Henry Morton, A.M., Emeritus Professor of Chemistry in the Philadelphia Dental College; also, Professor of Mechanics and Resident Secretary of the Franklin Institute; and Albert R. Leeds, A.M., Professor of Chemistry and Metallurgy in the Philadelphia Dental College, and Professor of Chemistry in the Franklin Institute of Pennsylvania. Philadelphia: J. B. Lippincott & Co., publishers. 1 vol., pp. 311.

We have seldom had so much enjoyment from any book as from the recent perusal of this most invaluable work. So clear, so simple, so practical and so sensible is it, that after reading it one seems almost to feel that he has had years of experience in the mysteries and wonders of chemistry. The authors announce in their preface that it was their object to produce a book of practical use to the student, and to give those more proficient a convenient reference book.

It seems to embrace many new and valuable novelties, besides all the old, that are interesting and useful. Nothing seems to have been forgotten, and the whole book is a charm from beginning to end. Charmed by its simplicity, and led on from chapter to chapter, the reader finds himself gaining much useful and valuable knowledge in a very little while. We believe every photographer might be a better one after reading it. It is printed on fine tinted paper, bound in most beautiful style, and illustrated by one hundred and sixty-three wood-cuts. The first edition was sold in a very little while, and the second, corrected and improved, is now ready. That we may more fully convey an idea of the style and value of the work, through the kindness of Prof. Morton we are permitted to extract one or two paragraphs upon his favorite theme—*Light*—beginning with that on the

"Composition of White Light.—We have heretofore spoken of light as if it were all of one kind; a simple motion of a definite sort. Everything we have said would indeed be strictly true, say of pure yellow light, such as is produced by burning alcohol and salt; but would require certain limitations if applied to white light, which is what we generally understand by the unlimited noun 'light.' This light is far from being simple; and we will now proceed to study its nature.

"If a ray of light, passing through a narrow opening or slit, is allowed to fall upon a refracting prism whose axis is parallel to this opening, it will of course be refracted or bent from its course; but instead of producing a single line of light upon a screen placed in its path, it will develop a broad band, in which all the colors of the rainbow will be found beautifully blended.

It would thus appear that in the ray of white light were all these colors.

"This decomposition of white light may be strikingly shown as follows. (See Fig. 44.) We place as an object, in an ordinary magic-lantern, B, arranged for the lime-light, a plate of brass having an opening in it $\frac{1}{8}$ of an inch wide, shaped like a rainbow, with three inches span. This being properly 'focussed' on a screen, say at a distance of 50 feet, the lantern should be tilted up, as shown in the drawing, and a prism held as indicated by the figure, in front of its object lens. The arch of light will then be depressed by refraction to the proper place on the screen, and broken by dispersion into all the prismatic or rainbow hues. The prism for this experiment should be made by grinding a glass bottle into the shape shown, figure 45, cementing plates of glass on the open sides with the mixture of molasses and glue used by printers to make their 'inking-rollers,' and filling it with bisulphide of carbon.

Fig. 44.

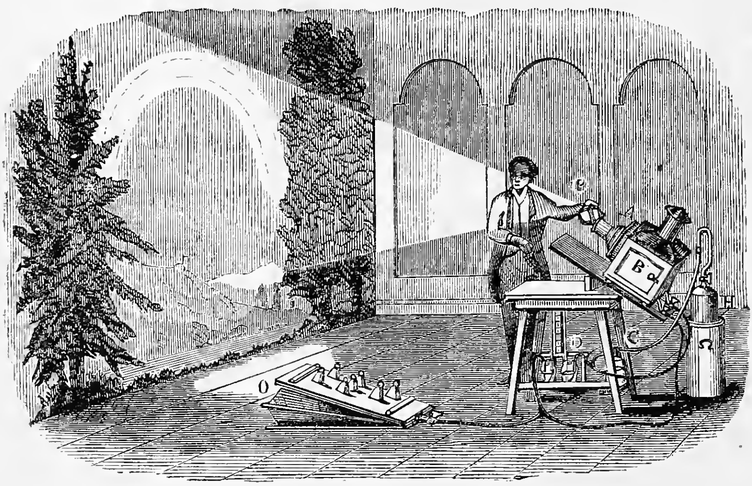
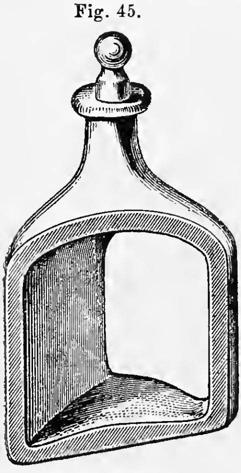


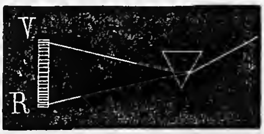
Fig. 45.



"We know on general mathematical principles, that the more rapid the vibrations in a ray, the more it ought to be refracted, and we therefore conclude that white light consists of not one only, but many kinds of motions; the slowest of which, separated from the others, as at R, is recognized as red light, while the most rapid is seen as violet at V; and all others arrange themselves in gradual progression as indicated in the colored plate facing page 123.

"Nor does our experiment stop here. By the use of delicate thermometric apparatus, (see page 121) we find that below R, Fig. 43, intense heat is present, gradually fading off as we descend; while a sensitive photographic plate or fluorescent screen will in-

Fig. 43.



form us, that above V (for a distance more than five times as great as R V, if an electric light and lenses and prisms of quartz are used), there is spread an influence which, though invisible, acts most powerfully in effecting photo-chemical decomposition, and may even become perceptible to the eye through the influence of fluorescent action: this we call ACTINISM.

"The variegated band or ribbon of light thus obtained is called a 'spectrum.' If sunlight is used in this experiment, and the spectrum, in place of being projected upon a screen, is examined through a telescope into which it is thrown, countless fine black lines will be seen crossing the band, which from their discoverer are called Fraunhoffer's lines. Passing over their cause, to be hereafter discussed, we at present notice only that they are absolutely fixed with reference to the colors of the spectrum, and their relative places in its length; and being sharp and well defined, are of the greatest use with regard to all purposes of measurement. (See plate.) The most prominent of these are marked upon the plate, and designated by the letters which have always been used to describe them. If by another inverted prism or lens, or otherwise, these colors are united, they produce white light again. It is customary to speak of the colors contained in white light and constituting the spectrum, as seven in number: Red, Orange, Yellow, Green, Blue, Indigo, and Violet; or as 3 primary colors: Red, Yellow, and Blue, with the various tints which would be developed by their combination; as Green composed of Yellow and Blue, Violet of Red and Blue, and Orange of Red and Yellow.

"We ought, however, to remember that these ideas are adopted merely for convenience; and that every tint is as truly a distinct thing, as each note in a musical scale. That each tint of color represents simply so many vibrations per second."

"THE last three numbers of your Journal have been what we call splendid. Shall ever remain your debtor."

PHOTOGRAPHIC SUMMARY.

BY M. CAREY LEA.

GERMANY.

Collodion for Instantaneous Views.—Wothly uses the following:

Good neutral ether,	16 ounces.
Alcohol,	10 "
Pyroxyline,	250 grains.

Next, dissolve in 2 oz. water, 50 grains nitrate of silver, and in 2 more, 40 grains iodide of potassium. Mix these two last, and let the precipitate of iodide of silver settle, wash it with distilled water several times, operating in the dark. Then take

Alcohol,	2 ounces.
Bromide cadmium,	30 grains.
Iodide ammonia,	100 "
Liquid ammonia,	5 drops.

If all does not dissolve on shaking, add a few drops distilled water, and then the well-washed iodide of silver. Shake again and filter. Add this to 16 ounces of collodion, which in a few days will be fit for use. If the plate, after removal from the silver bath, shows iodide of silver on the surface which can be wiped off with the finger, a little more collodion is to be added, to reduce the strength of the salting.

Phot. Corresp.

[The peculiarity of this collodion is, that the iodide and bromide in it are first saturated with silver, which it is claimed adds to the sensitiveness.]

Dry Plates.—Lederer in Vienna gives the following, which he says works better than tannin and honey. Take

Distilled water,	½ lb.
Acetic acid,	4½ oz.
Flaxseed,	1 "

Shake well, place in a warm spot for several hours, and filter repeatedly.

Use a collodion, containing iodides of ammonium, cadmium and calcium, and bromide of cadmium. Sensitize, wash with alcohol 1 part, water 5, until the greasy marks disappear, and then pour over the above solution repeatedly, and let it dry.

After exposure, lay the plate in a bath of distilled water, replace it in the silver bath, and develop with an ordinary iron developer. *Ibid.*

Negative Varnish.—The same journal extracts from Marneau's Almanac the following formula by Hörbst, of Vienna.

Rectified spirit,	1 lb.
White shellac,	$2\frac{1}{4}$ oz.
Gum benzoin,	280 grs.
Gum elemi,	35 "

Place in a warm sunny spot for several days, and filter. It is asserted that this varnish neither softens by heat, nor cracks by cold, and has been approved by long trial.

Direct Positives. — According to Prof. Schwartz, negatives may be converted into beautiful positives in the following manner:

Dissolve 50 grains nitrate of silver in 16 ounces of boiling water, and 43 grains of Rochelle salts in as much. Add and boil together for half an hour in a glass flask.

A second solution is made by dissolving 25 grains nitrate silver in $2\frac{2}{3}$ ounces water, and of this, take 2 oz., and add dilute liquid ammonia until the precipitate redissolves. Then add the remaining $\frac{2}{3}$ oz. of silver solution. Dilute, if necessary, to $3\frac{1}{3}$ oz., and filter.

Immediately before use, mix two parts of the first and one part of the second liquid in a small glass, and pour over the fixed and washed and still moist negative, which, under the action of the fluid, gradually changes to a positive.

These pictures may be varnished, but are rather injured by it; they are best preserved by being placed like daguerreotypes under a glass. The effect, especially when the effect of the changing fluid is continued long, is said to resemble that of a finely executed drawing in chalk.—*Dingler's Poly. J., extracted in Photo. Corresp.*

New Lenses. — The new "Pantascope" lens of Busch differs from the Periscope of Steinheil, that when it takes in still larger angles, it is achromatized, and, the maker's friends attest, gives sharper pictures. It appears to somewhat resemble the Globe focus, but to give much larger pictures for the same diameter of lens, and is sold for much less than the Globe lenses of the same maker. Thus a picture of 20 inches square is got with a lens of $1\frac{7}{10}$ inches diameter with a focal length of $9\frac{3}{10}$ inches, cost, forty-eight thalers, or thirty-two dollars at par of exchange. With a stop of $\frac{3}{10}$ inches, on a light day, such a lens requires seventy-five seconds' exposure. The included angle is stated to be 95° on the side of the picture, 105° on the diagonal. *Ibid.*

[Since the above was in type, I have seen, through the kindness of a friend, a circular issued by Steinheil, on the subject of his lenses. In it he partly admits that the visual and actinic foci do not correspond, and that a correction of $\frac{1}{48}$ must be made. For distant objects, the real focus must be determined by trials, and these have to be very exact, as he remarks, that the depth of focus is much greater for the visual than for the actinic rays. This cannot be considered as other than a serious objection, though not necessarily, a fatal one. In the next number it is probable that something more definite can be given as to their performance.]

[This journal contains a very remarkable illustration, a portrait of singular beauty, obtained by *retouching the negative.* The effect is to give a complexion of extraordinary softness and clearness. No information is given as to the mode of production except the above.]

ENGLAND.

Heliochromy.—Mr. J. Traill Taylor writes that he has obtained natural colors on paper, by washing it first with nitrate of silver, and then with fluoride of sodium. He thus obtains the green, blue and yellow of the spectrum in a remarkable manner. He also affirms that paper impregnated with oxide of silver dissolved in nitrate of ammonia, copies colors. So, too, with paper washed with chloride of barium and nitrate of silver, especially if the paper has been previously washed with iodine.

Mr. Taylor also cites a communication from Mr. Hudson. This gentleman prepares the following bath:

Chlorhydric acid,	4 drops.
Saturated solution of salt,	4 "
Water,	2 ounces.

Plunge a silvered plate into this bath for five minutes. Wash well with water, and dry over a spirit lamp. With this plate Mr. Hudson affirms he can obtain all colors. (It is, of course, understood that these colors

are evanescent, no method having been devised for fixing them.)

Dallmeyer reviews the subject of the Steinheil lens, and does not admit that such a lens could do first class work, in consequence of the very small stop necessary; viz., $\frac{1}{40}$ of the focal length. He rests on the objection to small stops arising from the diffraction of light, and announces that he will bring forward a lens capable of including an angle as great as Steinheil's, and of working with a stop of twice the diameter, namely, $\frac{1}{20}$ the focal length, and consequently requiring only one-fourth the exposure.

MORE ABOUT MAGNESIUM.

The question of photographing by the magnesium light having been satisfactorily answered, the next problem is to get the best and most artistic pictures by its use. As the subject has been considerably discussed in regard to arrangement of light and style of reflector, I would offer a few more remarks in relation to it. At the request of Mr. Wilson, some months ago we together tried a number of experiments as to our ability to photograph by this light. These trials were quite successful, and were followed by others, up to the present time. At first but one reflector was used, which, of course, gave to the picture heavy shadows. Afterwards two reflectors were tried with better results, but still it seemed almost impossible to obviate the difficulty of one or more Ghosts, looking over the shoulders of the sitter. A large reflector was then used, which diffused the light more, but was still liable to the same trouble. About a week ago I had an opportunity of experimenting with an exceedingly nice arrangement of mechanical lamp, made by the American Magnesium Company. The lamp was very portable, and easily managed, burning two strands of magnesium tape in a polished silver-plated reflector covered by a piece of ground glass. The clock work being wound up, a movement of the spring sets the machine running, unwinding the tape from two rollers, and forcing it into the reflector, which is lighted after running about two inches. A movable finger passing across the upper end of the tape, brushes off the oxide of magnesium formed, adding greater brilliance and steadiness to the flame. Many trials were made, using the lamp as a minor light, but experience proved that it was not suited for either the first or second illuminator not giving light enough with the ground glass covering, and entirely too much concentrated light with the glass removed. With the glass shield the light was very much subdued, and was not considered by those present at all trying to the eyes. But to render it useful to the photographer, I should advise an increase in the size of lamp, enabling more strands of wire to be burned. I desired to try two of these lamps together, but had only the opportunity of obtaining one.

In making the first trial with this new lamp, a picture was taken, using it as the greater, and a small tin reflector burning two tapers as the minor light, but the latter gave so much more light than the lamp, that I was obliged to give up the idea of using the lamp for the principal illumination. The same want of success also attended my trials with it as a minor light, so that I was obliged to discard the lamp entirely.

In one instance, portrait of a lady reading, the large tin reflector was used with six tapers as the principal, and a smaller tin reflector with three tapers as lesser light. On lighting the magnesium, I at once saw that the large reflector was giving a decided shadow; a piece of blue glass was then held before the reflector, and remained during the exposure. Although the light was very much diminished, the plate being found under-exposed on development, the Ghost had almost disappeared.

Hopes may be entertained of getting a much better and more manageable light by the use of reflectors shielded with a very light-colored blue glass, the kind used in this experiment being a very poor article of painted glass, quite opaque.

Another picture was taken of the same subject, using the two tin reflectors with a magnesium taper burnt behind the sitter, following the suggestion of one of the contributors of *The Philadelphia Photographer*, with very satisfactory results; but such a number of tapers burning, and the great heat given off, close around the sitter, is any-

thing but a pleasant ordeal to pass through, reminding one strongly of Signor Blitz's Canary birds sitting in a circle of fire. I really think more credit is due to the sitter than to the operator, should the result be successful in the present arrangement of burning the light.

The Magnesium Company have made one great improvement by the introduction of a very thin iron wire twined around the tapers, extending a sufficient distance beyond to attach the wire to the reflector thereby, having a more convenient mode of fastening, preventing the tapers dropping off and falling, while burning, on the bottom of the reflector, or on the floor, also giving a much more steady light, and adding many seconds to the time of burning, I should judge almost as long again as the first used. Another variety of taper had a piece of magnesium wire twisted around it in the same manner as the former, but my preference would be for the iron wire decidedly. The tapers at present sold by the Company are much heavier than those first used, and better in every respect.

No difficulty whatever is experienced in copying engravings, &c., by this light, one reflector being found amply sufficient, and the results excellent. The only serious drawback to the popular use of the magnesium light for photographing is the want of a really good lamp or reflector in which to burn the tapers, giving a steady light without blinding the eyes; also, if possible, some pipe or condensing arrangement to draw off the oxide of magnesium which flies about in the form of an impalpable powder, rendering a complete ventilation of the apartment necessary after each experiment.

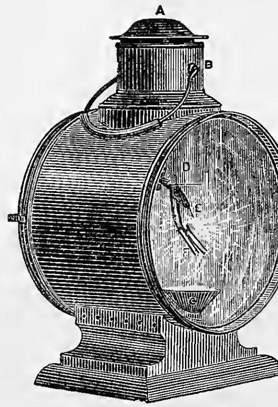
Jno. C. Browne.

February 12, 1866.

MAGNESIUM AND MAGNESIUM LAMPS.

The American Magnesium Company are now prepared to furnish lamps suitable for illuminating, with the magnesium light, dramatic scenes, tableaux, skating parks, &c.

These lamps are the result of a long period of costly experiment; and are, in every respect, we believe, greatly superior to any that have hitherto been invented for the



purpose. They are portable, easily managed, and absolutely safe,—as safe as a sperm oil lamp.

By the use of different colored glasses (which will be furnished to order) the light may be modified, and adapted to any purpose of theatrical representation.

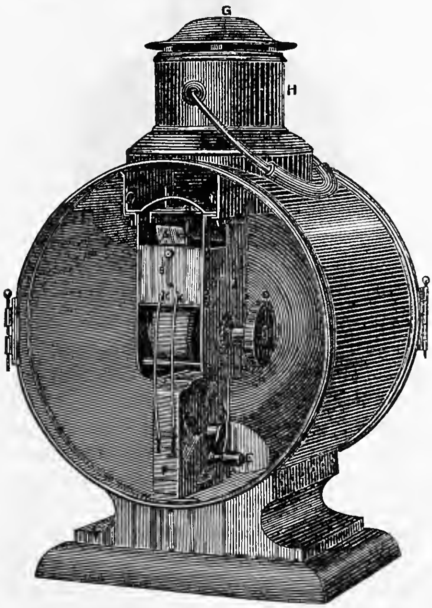
The cut above represents a front view of the lamp.

A is the top of the escape for the fumes, and retards them somewhat. B is the turret-shaped top which collects the oxide. C is a parabolic reflector, D, the chimney which catches the fumes, and conveys them to B. E is the magnesium ribbon, coming out from the feeders, and F represents an automatic tongue which scrapes off the continually forming oxide from the feeders. G is a hopper to catch the falling oxide, which is conveyed through it to a receptacle in the bottom of the lamp.

Magnesium in the above lamps is used only in the form of ribbon, wound upon reels, from which it is fed out by means of clockwork. The clockwork arrangement may be easily understood by the cut below, which gives a rear view of the lamp. A is the fore wheel, B the spring to start the clockwork, D the key, E the handle for winding the ribbon on the reel, F the reel, and K K the ribbon entering the clockwork from the reel.

With Mr. J. C. Browne, we have been making some experiments with this lamp and others, and with various kinds of tapers.

A paper upon the subject, in another column, by Mr. Browne, gives a full record of these experiments, and will be found quite interesting.



We have several letters upon this subject, and make the following extracts from some of them :

Mr. D. W. Kellogg, of Hartford, Conn., says, "In attempting to criticise your beautiful parlor group, I find something to regret on account of deficient illumination in the apartment generally, while the faces appear almost overdone; this suggests the question upon which I desire the opinion of those qualified to instruct. Will not one broad flat reflecting surface dotted with small magnesium tapers illuminate remote objects more, and the central portion less, and thus tend to secure good delineation in the dark drapery and the shadows? It is true there is a seeming necessity for some concavity in the reflector, for, in the use of a flat surface, the outer divergent rays are lost, or, striking some side objects, return and enhance the evil of too much diffused light, if such evil prove to exist, but is it not presumptive that artists have gone too far in their aversion to diffused light? Is it not quite practicable to produce sharp pictures, and at the same time welcome the kind ministrations of this questionable auxiliary diffused light? Would not a large screen covered with a good quality of silvered paper prove an ample reflector? It might be placed high when practicable, giving the top a corresponding inclination, and more or less quartering to the subject. The tapers should, of course, be so disposed as to combine into one great flow of soft light."

Mr. A. C. Nichols, of Leavenworth, Kansas, says, "I wonder none of your correspondents have broached the use of a diffusing screen between the sitter and light. Would any one of us expect to do harmonious portraiture seating our subjects in Sol's rays, direct or unsubdued, if even the light from him was of only the strength of magnesium flame? I know Mr. Browne reminds his questioners that it is little if anything like the sun's light. Still I think I see, by reading what all say of it, that the struggle is mainly to work harmoniously in an insufficiently subdued light; a light not diffused enough. True, to diffuse with thin white ground glass may weaken too much, but that is only after the manner of dame nature's wilfulness. Such a diffusing screen might do well, but whether it should be near the sitter, or near the light, is a question of experiment."

These are very useful suggestions. No doubt as experiments are made, a proper plan will be found to manage this new light successfully. We wish we had more time to work at the problem, and hope our friends will help us.

FAILURES AND THEIR CAUSES.

To the Editor Phila. Photographer.

A few thoughts have suggested themselves to my mind after reading your Prospectus for 1866. In olden times most of the articles for the journals were written by the practical operators of the day, and were more to the point and easier understood. The various processes and styles of manipulation that the journals are now filled with, I must say, are generally very indefinite and unsatisfactory.

Now, Mr. Editor, by your kindness, and through your Journal, the fraternity at

large get the benefit of the *practical* knowledge of the professor or amateur. After the greatest care in the world in preparing his glass, making his collodion of the very best materials, sensitizing his bath, filtering it, posing his sitter all right, developing with the new idea or something else, and fixing as usual, he examines his negative. Lo and behold! it is full of pinholes. He takes another; the collodion peels off; another, and it is foggy, streaky, or covered with branches, as if it was going to bring forth other fruit than the fruit of his industry; and so it is in printing, toning albumen paper, mounting, and in fact getting rid of your pictures, after many of those trials and tribulations you have to go through, in making pictures at the present day. Why is this? I recollect the first photographs exhibited at the Crystal Palace by Whipple & Black, under the name of the Talbotype; nothing like the difficulty that is experienced at the present day was experienced by those gentlemen then, or by the fraternity for I might say ten years afterwards, for it is only a few years since new formulæ have been given in the journals, and fresh inquiries by different artists of the causes of the many failures which they are constantly troubled with. Now, I ask what is the cause of those failures? Is the nitrate of silver impure? or the different iodides and bromides, ether, alcohol, or gun-cotton? Some blame one thing, some another; at last they come to the conclusion, wisely, too, they don't really know where the trouble lies. Or is it, Mr. Editor, caused by the innumerable processes, formulæ, or important improvements, that we see crowding the journals of the present day, chiefly from the pens and brains of amateurs and professors, and not the sayings and doings of the real practical photographers of the present time? Let the operator of the present period look back into Humphrey's Journal, Snelling's, Dr. Burges's, and Waldack's books, and they will find processes there that will not give them half the trouble that those published at the present day do. I do not attempt to deny that there are many good and valuable articles written by professors and amateurs, but theoretical practice should not be palmed off on the profession as practical experience.

Let us hear, as of old, from such men as Whipple, Black, Gurney, Fredericks, Bogardus, Davie, Williamson, O'Neal, Turner, Fitzgibbon, Gage, Webster, Germon, Faris, Root, mostly old contributors to the Journals, and hundreds of others that could give some good beneficial articles to the fraternity at large, and in such plain language that it would neither break your jaw to pronounce the big words of many writers, or need an interpreter to understand, or the last resort, a Webster's dictionary, to explain what they are talking about.

JUSTICE.

NEW YORK.

[We think it nothing more than common "Justice" that our venerable correspondent should "practise what he preaches," and send us a real good "*practical*" paper once in a while. Let us have an abundance of "Justice."] ED.

BROMIDE AGAIN.

I HAVE taken considerable interest in the late proceedings under the "Cutting Bromide Patent," and knowing something of the feeling of photographers in this section, I wish to state some things that are not fully understood "Out West."

First, if the patent is as strong as is now claimed, why was it not good when first issued, and if good, why was it not enforced? Is any one "green" enough to believe it takes ten years to enforce a good patent? Are patent laws operative only after ten years' existence of a patent? Astonishing discovery!

Again, have not the owners of the Cutting patent consented to its infringement, and are they not barred by such consent from enforcing it? So far as actions could do it, they have given permission to the public to infringe their patent, and have not the public some rights as well as patentees? Having allowed the free use of their patented article for ten years without warning, or notice, or attempt to enforce it (for the Fredericks suit was fairly abandoned by the original patentees by allowing it to lay so long untried), can the public be deprived of its use after it has become a necessity? When a man lets go his rights, can he take

them up again to the injury of the whole community? If the case is ever tried, undoubtedly this will come up in defence. It is also stated that it is unlawful for men to combine to defeat a patent, and on the contrary it is supposed to be strictly lawful for lawyers to combine to fleece the public under a patent abandoned by the original claimants.

Again, Mr. Hubbard says, in his letter to you, "Time enough has been taken by photographers to patiently investigate and settle in their own minds what their rights are." None but a lawyer could have written that. If the owners of the patent have kindly waited ten years for photographers to make up their minds, is it not rather a rude awakening Mr. Hubbard has given them, as he calls out, "Pass up your hundred dollars, and be quick about it?" Some one has evidently misinformed him. Photographers would like about four years more to think the matter over. But do the owners of good patents generally wait ten years for those who are constantly infringing them to make up their minds to pay? It strikes us this way, their conduct is on the contrary slightly the reverse. They generally know their rights a little better than that in New England, the land of patents.

Again, you say, when Fredericks & Co. failed to get a continuance, they were compelled to submit to a decree against them, and "the only adjustment made by them was the amount of damages." But some evil-disposed persons this way hint that the adjustment of damages adjusted a judgment by default which could never have been obtained in any other way. I see some in New York have been wicked enough to say the same thing. It is shocking how people will talk. Besides, photographers living here who contributed to defend the suit say that Mr. Fredericks could have "adjusted damages" without any aid, and that as he has failed to apply the money for the use for which he received it, they will trouble him to hand it back. Will Mr. Fredericks respond? Of course, we do not understand these things as well as those who live in the light of the great centres, but that is the way they appear "OUT WEST."

CINCINNATI, January 15, 1866.

For the information of our correspondent, his friends "Out West," and the rest of the fraternity, we would reply, in answer to his first query, that the patent in question was quite "as good" when first issued as it is now, and *vice versâ*.

Furthermore, the ownership and right to the benefits of any patent continue for the full time for which the patent is granted.

It is a very disagreeable thing to have to speak in favor of this patent against our will, and we trust our correspondents will look upon our paper on the subject in the January number as final from us, and spare us further trouble on this score.—ED.

THE STAMP INFLICTION.

TO THE HONORABLE THE COMMITTEE OF WAYS AND MEANS:

THE undersigned, on behalf of the photographers of the United States, respectfully ask leave to present the following statement, concerning the embarrassments to which they are subjected by the operation of the existing provisions of the Excise Laws relating to their business, and to ask such relief as, in your opinion, they are justly entitled to receive.

Photographs are classed, properly, with "works of art," and the reasons which have induced the exemption of paintings and statuary from tax will apply with equal force to a large proportion of the most valuable products of photography.

We observe that the Revenue Commission advise the repeal of the taxes heretofore imposed on books, magazines, and other printed publications, and in view of this fact, and also, that all the articles used in our business are taxed, both directly and indirectly, we believe that if books are exempted, it will be deemed equally politic and equitable to relieve our products also. But, if the necessities of the Government require that our business shall continue to be taxed, we will accept, most cheerfully, the portion of the common burden allotted to us—so far as the amount accruing to the treasury is concerned—asking only that it may not be unduly increased by the vexatious, embarrassing, and damaging requirements now imposed for its collection.

We object to the stamp duty on photographs, &c., because:

1st. Those which are put up in cases cannot have the stamp exposed without marring the picture to an extent which will materially lessen its value, and frequently prevent a sale; while if the stamp is concealed, the payment of the tax cannot be shown without serious inconvenience.

2d. It constantly occurs that pictures when packed are damaged by the "setting off" upon the front or face, of the ink used in printing the stamp, which is affixed to the reverse side, and the slightest imperfection of this kind is sufficient cause for returning them—and in the case of family pictures the result is a total loss—not only of labor, material, and profit, but of the tax paid thereon.

3d. An important feature of the photograph business has been developed by the demand for pictures of localities made famous by the war, and the growing taste for photographs of American scenery. These frequently require to be sent long distances by mail or by express, and for convenience as well as economy, are not "mounted" until finally sold for use. To attach stamps in this condition is to render them liable to be damaged by increasing the thickness of each sheet—and consequently of the package, in whatever part the stamp is affixed. And if they escape injury—the stamp must be removed before the picture is mounted, and others afterwards attached, corresponding with the price of the final sale; thus requiring the payment of duty twice, in addition to the extra trouble and risk.

4th. It is difficult in many cases for even an expert to determine whether pictures are copies of engravings or paintings, or are originals; and it therefore happens frequently that those on which an ad valorem duty has been paid by the producer, are required to be stamped in the hands of the dealer, in order to exempt them from seizure, or to avoid trouble of collecting satisfactory proof that the tax has been paid, always difficult when the place of sale is different from that of production.

5th. All articles liable to stamp duty are required to have the stamps attached when "exposed for sale." Compliance to this has already subjected us to losses which will become greater as our business and stock increase. A damaged picture has no value. To be salable it must be perfect. Hence, as our stock on hand becomes soiled by the constant handling of purchasers in making selections, we are subject to the loss of both our goods and the duties paid thereon.

For these and many other equally forcible reasons which might be stated, we ask to be relieved from the payment of any duties on our products, in stamps, and to be permitted to pay such percentage on our sales monthly—in like manner as manufacturers—as in your judgment is equitable or necessary.

Samuel Masury,
G. H. Loomis,
Delegates from New England.

Benj. Gurney,
C. D. Fredericks,
Delegates from New York.

Edward L. Wilson,
W. L. Germon,
Delegates from Philadelphia.

Bendann Bros.,
P. L. Perkins,
Delegates from Baltimore.

M. B. Brady,
Alex. Gardner,
Delegates from Washington.

Washington, D. C., Feb. 14, 1866.

The above will be better understood when we say that the gentlemen whose names are appended thereto have volunteered to do what they can to secure an abolishment of the stamp infliction. Being one of the delegates we feel at liberty to say that the best reception was given by the Committee on Ways and Means to our delegates, and that we have much hope of accomplishing all we desire. See our next issue.

PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

Proceedings at Regular Stated Meeting, Wednesday Evening, February 6, 1866.

Coleman Sellers, Esq., President, in the chair.

Minutes of last meeting read and approved.

The Committee on Procuring a Magne-

sium Lamp for Magic Lantern purposes and for the use of the Society, reported correspondence with the American Magnesium Company who were experimenting, and hoped soon to exhibit a lantern to the Society that would fully come up to their desires.

Considerable discussion ensued upon the subject of a committee to purchase books for the library of the Society.

The Chairman proposed a plan adopted by other societies of keeping a book upon the table for the members to insert the titles, and publishers' names of such books as would be of value for the purpose named, and of such as they would like to have.

After much discussion it was resolved to re-appoint the former Library Committee, and that our annual appropriation of fifty dollars be made and placed in their hands for the purchase of books.

Mr. Wilson read a note from Mr. Lea expressing his regret at the delay in supplying the members with some of his developer, but that he was studying it carefully and constantly, and as soon as he found the best form, he would furnish specimens.

The President read a note from Mr. G. H. Loomis, photographer, Boston, stating that a delegation would soon be in Philadelphia on their way to Washington, to endeavor to effect a modification of the Revenue Tax Law as it bears upon photographs, and asking the appointment of delegates to accompany them.

The Corresponding Secretary was instructed to reply.

Mr. Wenderoth read a paper on Opalotypes on Iron (page 80), which was accompanied by several beautiful specimens, which were very curious and much admired.

The President inquired of Mr. Wenderoth, if the art or process of mixing chalk with gelatine, and so making a film, printing upon the film, and then separating from the plate glass, was ever tried by him?

Mr. Wenderoth replied in the negative, but that he had seen the process in print. Mr. Wenderoth added that such pictures could be colored, but that the color would wash out.

Mr. Wenderoth then said, "I take the liberty to-night to bring to your notice some preparations of my own make, one of which is a varnish, and the other a size, and which I hope will be of great importance to photography. The properties I claim for the varnish are as follows:

"1. When applied to water-color paintings, pencil and crayon drawings, it will make them as water proof and permanent as oil-paintings, without giving the slightest tinge to paper, or changing the tint of either transparent or body colors, and without giving any gloss, when applied to dead surfaces.

"2. Applied to glossy surfaces, it heightens the gloss.

"3. It will render permanent well-prepared photographs by securing them against atmospheric influences.

"4. It is colorless, and will not change color, neither crack nor contract, and has no effect on the texture of paper.

"5. Used as a size, it will make unsized papers water-proof, and fit for water-coloring without injuring their surfaces, or affecting their whiteness.

"At the same time I would call your attention to my adhesive preparation for painting on albumen paper with common water-colors. A very little of it mixed with common water-colors will make them to lay easily and smoothly on surfaces which otherwise would refuse to take colors. The preparation is guaranteed not to be injurious to the photograph or the colors."

Mr. Wenderoth made experiments with his preparations before the Society, proving their practical worth. A handsomely colored portrait was varnished by him, a tumbler of water then poured upon it, and then wiped dry. No harm whatever was done by the water. Albumen surfaces were made to receive color as if by magic.

A committee was appointed to experiment with, and report upon the merits of Mr. Wenderoth's varnish at the next meeting.

Mr. Wilson: I have in my hand a picture which was presented to me by Mr. Carbutt, of Chicago. This is put on the dial plate of the watch by photography.

Mr. Fassit: I think they are a bad thing for photography, and will never become popular, as they have to be made *on tick*.

Mr. Wilson: Exhibited three Swan's Car-

bon prints which belong to Mr. Lea, who had kindly sent them for inspection.

Mr. Browne: I have several little things to speak of, one of which is the new Excelsior collodion. You have all probably heard of the lawsuit in regard to the bromide as rendering every one using it liable to a certain tax. This collodion is reported not to have a particle of bromide in it. I have made several pictures with it, and it does appear to me to be an excellent thing. It is made by Mr. O. S. Follett, of New York. These three pictures were taken by about the same length of exposure. I used my ordinary bath and developer. I was much pleased with the result.

Mr. Wilson: I have, through the kindness of the American Magnesium Company, one of their patent lamps, which I will now exhibit. Mr. Browne has been experimenting with it, taking pictures.

Mr. Browne: Mr. Wilson and myself tried many experiments with this lamp, using it as a principal and minor light, but with rather poor success. Although the light from it is very soft and pleasant to the sitter, with the ground glass over the reflector, yet a great want of light was noticed on developing the plate; with the glass thrown back the light was reflected into a complete focus, perfectly blinding to the eyes, while the body was in shadow. I was desirous of trying the effect of light-colored blue glass before the reflector, but could not obtain any in time for the experiments. The best pictures taken were made by burning a magnesium taper behind the sitter, using also two reflectors in front. The number of trials made with this lamp in different positions, prove to us that it is not well adapted to photographic purposes. Should larger ones be made, burning 4 or 6 tapers, the result I have no doubt would be different.

The President: In reference to the use of the magnesium light, some time since we had occasion to make the photograph of a large planing machine, which it would have cost a great deal to have had taken into the open air. All attempts heretofore to make photographs of the machine in the shop have failed. I procured some of this magnesium wire, and the assistance of Mr. Hemphill. We lighted the machine by twelve strands of wire and two lanterns, a principal and subordinate one, then allowing the daylight, what there was of it, to soften the picture by continued exposure of from ten to fifteen minutes after the lights had gone out. The negative was one of the finest I have ever seen. I expect by the next meeting to be able to show the Society a specimen. The negative was 14 by 18, and made with a twelve inch Globe lens.

Ques. Did you throw the light on the front part?

The President: No, sir, rather to one side. Some of the dark parts we had to illuminate separately; we burned them near the dark part. This was on a dark snowy day. We had tried many times before, but had always failed, and so had given it up.

I would also state in reference to my experiments with the collo-developer, that it was reported, in the January number, that the proportions that I used were stated from memory altogether, and a note appended to the report inferred that I had not used them in proper proportions. Since then, I have examined my memorandum, and found that I had not reported correctly. I used it exactly as prescribed, without having a good result at all.

It was resolved, after much discussion, to have phonographic reports made of the meetings of the Society for publication in *The Philadelphia Photographer*, the original manuscripts to be filed among the archives of the Society by the Secretary.

The President and others spoke highly of such a measure, and arrangements were made with Dr. C. H. Morgan to report the minutes.

On motion, adjourned.

CORRECTION.

Mr. Editor: In the January number of *The Photographer*, in reporting the proceedings at the Society's meeting, in connection with the reports on Mr. Lea's developer, you say that I referred to the fact, that in the matter of keeping it on, the collo-developer was greatly superior to the common iron developer, as it did not bring out what was not affected by the light.

I do not remember how I expressed my-

self, but what I meant to say was, that the action of the collo-developer would stop where the action of the light had stopped; that it goes so far and no further. Whereas the action of the common iron developer proceeds as long almost as it is kept on the plate, covering at last even the deepest shadows with a deposit.

Further on, you say, "Mr. Wenderoth has exhibited some very beautiful negatives, and has shown that a decidedly better effect can be produced than with the ordinary iron developer. But there may be circumstances in which the Lea developer may be peculiarly applicable." This phrase is somewhat confounding and contradictory, as not only the first two negatives as exhibited at the December meeting, but the six exhibited at the January meeting, have demonstrated beyond a doubt that the ordinary developer, at least in my hands, has been proved to be far superior in every point to the collo-developer, and as regards the fogging of wet plates, I think that experienced operators are very seldom troubled with it.

My second experiments were even more unfavorable to the collo-developer than I supposed the first ones to have been, as it was shown that to obtain the same kind of negative which had been obtained by the ordinary developer in sixty-five seconds' exposure, would take with the collo-developer from two and a half to three and a half minutes.

Very respectfully, yours,

F. A. Wenderoth.

OUR PICTURE.

The very beautiful little picture from nature presented to our readers this month is of Montville Falls, New York. Montville Falls are on what is now called Mill Creek, a branch of the Owasco Inlet, and just above Moravia Village. After laughing and tumbling along its wonted pathway, buffeting and combating with the old gray rocks, the frantic stream makes a mad leap of one hundred feet, below, and then foaming and raging awhile at the foot of the Falls, hastens along, quite subdued, bending ferns here and there, or floating some unfortunate leaflet upon its crystal surface, toying and playing with it before giving it a right good bath.

Not a little interest is connected with this locality. At the village of Montville, from which the Falls derive their name, Ex-President Fillmore read law with a Judge Wood, who is not so well known as his illustrious pupil.

At Moravia, where our artist lives, about the year 1818, Jethro Wood received a patent for his cast-iron plough; the patterns were made in a steelyard factory by Elias Rodgers, and the first plough was cast there.

Soon after this, these men built a furnace at the foot of these Falls, and obtained their blast from the falling of the water without the aid of machinery. We are told that they used a cauldron for their furnace, and from this small beginning sprang that wondrous implement of agriculture which has opened the way for thousands of other inventions in the line of ploughs, mowers, reapers, rakes, and all other implements needed for the present high state of cultivation with which our country is blessed; so, small as it is, our picture is not without interest. We have had it ready for some time, but were unable to give it place any sooner. We are indebted for the four negatives from which the picture was printed, to Mr. E. H. Alley, of Moravia, N. Y.

The negatives were made with a Voigtlander one-third portrait tube, smallest stop. They were sent to us voluntarily by Mr. Alley, thus showing his great and friendly interest in the success of his favorite Journal. They need no praise from us, as the pictures speak for themselves. We are assured by our kind artist that we would be quite as welcome to larger negatives, if he only had a way to get his larger apparatus to the spot. As it is, no doubt we all thank him.

"Your Journal is truly the Photographer's friend. Cannot speak too highly in praise of it. It is worth three times the amount paid for it."

W. R.

Meadville, Pa.

Salad for the Photographer.

HEREWITH I send two and a half dollars; fifty cents for Photographic Mosaics, and the balance of my subscription to the Journal. I am much pleased with *The Photographer;* it looks as though our beautiful art had at last really an honest advocate in the shape of a monthly publication.

The collodio-chloride process published in your December number I have tried, and like very well. I would suggest to parties working on porcelain, either wet or dry plate processes, the following method of toning. After the picture is printed or developed, as the case may be, wash well and fix thoroughly in hypo, and then flow the plate with a weak solution of sulphuret of potassium, such as many use for strengthening negatives; when the right color is obtained, wash again thoroughly. What the chemical effect is, I am not chemist enough to answer, but in appearance the pictures are as beautiful as when toned with gold. The only difference I see is, that when toned with sulphuret, they need not be printed so dark, and in the development process they must not be developed too much, as they gain strength by the toning. The collodio-chloride process is not new, except in its application to porcelain. As long ago as 1857, I saw my brother, V. M. Griswold, in Lancaster, Ohio, making prints upon collodion surface paper, the collodion being sensitized with ammonio-nitrate of silver and sal ammoniac. I think he has some of the prints made at that time in his possession now.

EDITOR PHILADELPHIA PHOTOGRAPHER.

MY DEAR SIR: Seeing in your issue for December, a statement that the Sutton light, which you had praised so highly in your June number, was a failure, I thought I would drop you a line, with a few prints, to show that it could be used. It struck my fancy as *the thing* when the plan was first published in the Notes, but let it run from time to time until after you republished it in June. Last fall I caused a light to be built after the plan, and all who see it call it good, and many photographers say the best light they ever saw. I send a few prints, all at hand just now, to show the effect of light only, as, of course, we country operators do not pretend to manipulate with the city operators, or to keep our chemicals in as pure and fine a working state. But I can say that with this light you can produce any amount of light or shade you or your subject may wish.

Yours, truly,

E. H. ALLEY.

MORAVIA, N. Y., January 12, 1866.

MR. ROBERT BENECKE, of St. Louis, Mo., writes: "As I have derived many benefits from reading journals, and copying ideas and suggestions, &c., therefrom, I deem it nothing but fair that I should reciprocate, and if you think it worth while to tell your readers the following two items, you are welcome to it:

"Did it ever occur to you or to any of your subscribers that the silver solution would run into drops on the albumen paper after it was hung up to dry? A sure remedy for it is to take a tuft of cotton, and rub the paper well before silvering. This never failed with me.

"Have you ever had a negative that was too intense to make a good print? I had one the other day, and made it do in the following manner: I took a very faint impression on thin paper, washed it, and fixed it in strong hypo. Then I pasted this print on the back of the negative, and succeeded in getting right good prints from it. (This negative was a copy from a steel engraving.)"

VENTILATION. — There is no doubt but what many photograph failures are caused by want of proper ventilation of the dark-room. We have known them to be almost suffocating with various fumes, gases, &c., certain to cause fogging and other evils. In this country the dark-room is poked away in the smallest space and most obscure corner as a general thing. This should not be, for, next to getting a nicely lighted and sharp image upon your plate, the manipulation in

the dark-room is of the utmost importance. The room should be at least ten feet square, well lighted with orange-colored glass, and well and properly ventilated; with all this it should be kept clean and free from the accumulation of dirt, and brushed out frequently with a wet cloth, never in any other way. These are small matters, but of great importance.

Photographic Journals. — At a late meeting of the Edinburgh Photographic Society, in an excellent paper on the Influences of Photography, Mr. Thomas Watson remarks that "it is possible to read the journals, and still be a bad photographer: but it is certainly impossible to be a successful photographer without reading at least one of them. All success, then, to the journals, and those by whom they are conducted! and may photographers generally not only be diligent students, but, as opportunity offers, useful contributors!"

In closing, he remarks with much truth, "Photographers who really want good pictures should adopt some special process, and stick to it until they get as near to perfection as in the nature of things it is possible to attain to." Mr. Watson's views are positively correct in these two points, and we should be glad to have space for his whole paper.

Efforts are being made in various directions to petition Congress to relieve us from the stamp nuisance.

Much haste should be exercised, or with the aid of magnesium and the Woodbury process we shall be ahead of Congress, and it will have to *petition us* for revenue upon other kinds of pictures which are made by photographers, and which cannot now be taxed as "sun pictures" or defaced with one of those "playing cards" or "proprietary" farces. Loyal brethren at Washington, awake to the interests of the public weal!

Editor's Table.

The Official Directory and Law Register of the United States. 1 vol. Octavo. Five dollars. New York. John Livingston, Editor and Publisher, 128 Broadway.

As its title indicates, it contains the names and places of residence of all lawyers in the United States and Territories, and designating who are practising, who have retired from practice, and who are on the bench;—the names of all the counties and shire-towns;—the executive, judicial, and county officers;—the commissioners of deeds, notaries public;—the times and places of holding the courts; with much other information useful to every lawyer and business man, as well as to all executive, judicial, legislative, and county officers.

Being himself an eminent member of the bar, Mr. Livingston has every facility for compiling such a work as this, and has had the co-operation of the heads of the departments and bureaus at Washington, governors, judges, secretaries, clerks, lawyers, and private gentlemen, to such an extent that his work is quite perfect and complete. A pamphlet containing a few pages showing the plan of this magnificent and useful work, will be sent to all applicants. Every page of the work contains an immense amount of useful, valuable and important information.

The Scientific American.—When speaking for a new work, we think if we can rightly say that it is *useful*, we are enabled to say a great deal for it. Of the Scientific American we need go no further than to say that it is *useful* to every man, woman, and child in the land. It is the very best of the kind in the world, and we know of no other publication that seems to be indispensable to so many classes of people.

The editor seems to be quite solicitous about our illness from a "full dose of bromide of potassium." We thank him for his interest, and are glad to say that we are now *convalescent*, having recently tried collodion without bromides, and found it to be soothing and healing.

Destructive Fire.—We regret to learn of the total destruction of the late photographic establishment of Mr. J. Mueller, of Council Bluffs, Iowa. Mr. Mueller's property, valued at $3500 was all burned, and he was without insurance. We are glad to learn, however, that he is rebuilding, and hopes soon to be under way again, with new rooms, new apparatus, and, we hope, lots of new friends and patrons. So clever a man deserves a better portion, but we hope he has only been pulled down to be set up better, and he has our warmest desires for his entire success.

To R. G.—You will find all you desire by reading "The Story of a Carte de Visite" in our last volume. There you will find formulæ which we know to be good.

The Photographer for Last Year.—We can yet supply a few volumes of the Journal for last year at three dollars each. The June or December issue alone is worth the price of the whole volume. An immense amount of useful matter is contained in each number.

One volume for 1864 (the first volume) may also be obtained for five dollars. The only one we know of to be had for any price. Those desiring complete sets should at once secure them.

We have received a parcel of very beautiful stereos from Kilburn Bros., Littleton, N. H., of White Mountain scenery. We were surprised when they wrote us that they had only been eight months in the business. Such effects as we find in "Profile, Franconia Notch," "Dixville Notch," "Falls of the Ammonoosuck," and "Falls near Mount Mansfield," are seldom acquired after years of practice. We say a great deal when we say they are quite equal to Moran's views of the same locality. "Cumberland Street, Portland, Me.," is also very fine. Messrs. Kilburn Bros. publish a catalogue of their views, which they will mail to any one. It embraces a fine collection.

Correction.—Our types made us manufacture nonsense in publishing Mr Shepard's formula for making chloride of gold in our last number, and in place of "Wash this, then filter, clean with water," &c., which is nonsense, it should be, "Wash this on the filter clean with water," &c.; and in the last line, "Chlor. of gold and *sodium*, should be, "Chlor. of gold and *calcium*."

To Correspondents and Others —Those desiring information upon any photographic topic, and those desiring to send books or parcels to the editor, should address them to Edward L. Wilson, Editor *Philadelphia Photographer*, Seventh and Cherry Streets, Philadelphia. We desire that our contributors should not be troubled to answer communications which they have no interest in, and have not time to attend to. We cheerfully reply to all such by letter, if solicited.

We have in store for our subscribers some precious gems in the way of photographs for our coming numbers. In our next we hope to publish a portrait group, with diagrams of the skylight in which it was made, and afterwards a fine composition from life by Loescher & Pestch, of Berlin, Prussia, and another by Wm. Nottman, of Montreal, Canada. All of these are under way, and are sure to come. Either of them will be well worth six months' subscription, to speak moderately. Get all your friends to subscribe, for being foreign photographs, the supply will be limited.

The Photographer for 1866.—We are much indebted to the Press for their kind notices of our improvements in size for the new year, &c.:

"It is one of the most elegant and pleasing specimens of the typographical art ever issued, and it is as truly excellent in its contents as it is handsome in its appearance. It contains a great amount of original photographic information by the best writers upon the subject."—*Scientific American.*

"Elegantly printed and illustrated by original photographs, and contains the latest intelligence relating to the beautiful and useful art of photography."—*E. G. Squier, Esq., Ed. Frank Leslie's Newspaper.*

"It is by far the best of its class in the United States."—*Dr. R. Shelton Mackenzie, Editor Philada. Press.*

"In every respect your magazine is deserving the patronage of the learned and the wealthy."—*John Livingston.*

"We *could* not, we *would* not be without it for many times its price."—*Subscribers from all Directions.*

The Photographer now circulates from Canada to Central America, and from the island of New Brunswick to California, Utah, and Dakotah. Those the farthest off seem to appreciate it the most. Will every reader please send the addresses of their friends in the craft, that we may reach them. It will be doing them real service, as well as us.

Popular Lectures.—We have recently been favored in our city with another of Prof. Morton's popular lectures on Light, and also a most interesting one by Prof. R. E. Rogers on "The World We Live In." They occurred so near to the time of our going to press that we are unable to give more extended notices of them until our next.

Caution to Western Photographers.—A man calling himself S. A. Furlong has been travelling among Western Photographers for some time, swindling them under the pretence of selling them valuable formulæ, &c. &c. He left St. Paul's, Minn., under very suspicious circumstances, and should be avoided by every one. We are sorry he has already victimized so many. Let others beware.

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On the Spontaneous Re-sensitizing of Iodide of Silver.

BY M. CAREY LEA.

A NUMBER of curious experiments have been made at various times which have tended to show that after iodide of silver has been exposed to light for a considerable time, its sensibility can be restored by certain agents. For example, it has been shown (I believe by Prof. Dawson), that iodide of potassium has this effect, and Prof. Himes showed that tannin also had the like power. But always, so far as I am aware, this recovery of sensibility has been produced, or attributed to the action of a sensitizing agent. And I believe it has never been demonstrated, as I here propose to do, that *pure iodide of silver will spontaneously recover its sensitiveness to light without any extraneous agency whatever.*

Some pieces of ground glass were silvered in the manner which I have already described in previous papers, and were then iodized by leaving them for some hours in a bath of iodine dissolved in a solution of iodide of potassium. In accurate experimenting, I always prefer the use of iodide films prepared in this way, because thus alone I am certain of thoroughly eliminating the influence of organic matter; and I may remark in passing, how completely the mere fact that this system is possible, contradicts the assertion, so often repeated, and which I have so often controverted, that pure iodide of silver is insensitive to light. This sensitiveness, so long and so persistently denied, is in actual fact so well marked and invariable, that it may be made the basis of a series of experiments, looking to the determination of questions perfectly distinct from it.

A piece of glass, so silvered and iodized, was thoroughly washed, and was then, not merely exposed to light in the ordinary manner, but was laid in a clear, bright sun for several hours. It lay thereafter on a table for many more hours in strong diffuse light. It was then put into a yellow envelope, and was laid in a dark drawer, where it remained for thirty-six hours.

It was then taken to the dark-room (without, of course, exposing it freshly to light), was placed in a printing-frame under a negative, and exposed for a couple of seconds to sunlight. Removing it from the frame, a collo-developer with nitrate of silver was poured over it, and brought out without difficulty a clean, sharp image. There was not the least tendency to fog; in fact, the image was particularly free from any such disposition.

This experiment naturally led to another, in which the conditions were varied. In

the foregoing, there was no organic film, and no nitrate of silver in the free state present. In the following, both of them were; and bromine was present, which was not the case in the first experiment.

An ordinary plate was coated with an ordinary bromo-iodized collodion, and was sensitized in an ordinary negative bath, containing a trace of free nitric acid. It was then, without washing or other preparation, but exactly in the condition in which it came from the nitrate bath, laid in a bright sun, in which, and subsequently in a bright, diffuse light, it remained for some hours till the end of the day. The plate was then washed under a tap, set in a closet over night to dry, and next morning was exposed under a negative to diffuse light for a few seconds. With a developer, an image was obtained without difficulty: not clean and bright, however, as in the preceding case, but fainter, and with some tendency to fog.

I cannot but consider these experiments as remarkable ones, and as being strikingly against that theory which imagines the existence of a chemical decomposition or reduction, in the formation of the latent image. The mere attempt to apply the chemical theory to such a case seems to result at once in the production of a series of absurdities.

An exposure of ten seconds in a camera will produce a latent image. That is, according to the views of those who sustain the reduction theory, it will liberate enough metallic silver or subiodide (they are not agreed which) to form the foundation of a developed image. Now, my first plate remained about three hours in direct sunlight (I will even leave out the exposure to diffuse light, which was equivalent to perhaps half as much more sunlight; the case is quite strong enough to spare it), which three hours is eighteen hundred times ten seconds. Then the direct sunlight is perhaps a thousand times as strong as the light in the camera (speaking very roughly, as the light in the camera varies between wide limits), so that the exposure which this plate underwent was, we may say very roughly, *eighteen hundred thousand times* as long as the camera exposure. Nor is there here any possible ground for cavil, for there is no reason to suppose that had the plate been exposed in the sunlight for three days instead of three hours, the result would have been different.

If then an exposure of ten seconds is sufficient to produce a reduction of a certain definite quantity of silver, an exposure so very much longer ought to cause the reduction of a quantity larger in proportion, if, indeed, the quantity of iodide present was sufficient to furnish so very large a quantity. And when the developer was applied, such a plate ought to fog instantly all over.

But it does not. Not only does the silver not become wholly reduced, nor the plate merely not fog, but it is actually in a condition, after a brief rest in the dark, to receive a fresh impression. It is not even necessary, as proved by the first case, to wet the plate—it simply recovers its sensitiveness by reposing. Is not this very wonderful? And does it not completely disprove the chemical theory?

It has been a favorite argument with the reductionists, that an exposed plate recovered its sensitiveness by immersion in a solution of iodide of potassium. This, they said, restored the iodine which had been separated by the reducing influence of the light, and the plate thereby returned to its original condition. But here is a plate which recovers its sensitiveness *without* iodine being restored to it. What went with the iodine which the reductionists say is eliminated by the light? It must have been dissipated through the atmosphere. How then was it restored to the decomposed film?

These experiments may be taken as a complete *reductio ad absurdum* of the chemical theory, which is thus seen to involve the following insurmountable difficulties:

1. The iodide of silver on the plate which I used, weighed less than a grain. Consequently, if, in the exposure of such a plate in the camera, there was a reduction of any definite quantity of silver, and that quantity reached the one-eighteen-hundred-thousandth part of a grain, then by the long exposure of any plate in the sun, the whole of the silver ought to have been reduced. This was not the case.

2. But supposing that the quantity of iodide of silver decomposed was even far less than this, still it was, in any case, eighteen hundred thousand times enough to fog the whole plate. Why then did not the whole plate fog?

3. As the plate did not fog, it must, according to the views of the reductionists, have been re-iodized. Whence then did it recover its iodine? On this point, it would be very interesting to hear a plausible explanation.

4. If iodide of silver is so easily capable of decomposition by light, as asserted by the reductionists, how is it (even putting all the other difficulties for a moment aside), *how is it that a portion escapes decomposition by a three-hours' exposure to light, and yet is decomposed by a two-seconds' exposure next day?*

These difficulties, altogether insurmountable by the chemical theory, involve no contradiction with that which ascribes these effects to a physical cause. According to this view, as there is no decomposition, so there is no need of constitution. The reproduction of a latent image is ascribed to some mere molecular alteration, or polarization of the particles of iodide. As to the exact nature of this change, from the very nature of the case it is necessarily very difficult, if not impossible, to define it. But I have already, in a previous paper, endeavored to show that a pure physical cause is sufficient to produce analogous results in other cases; that simple pressure on glass will determine the deposition of a precipitate upon those places, and that, in a very similar way, simple pressure upon iodide of silver will cause a deposit of silver on the parts subjected to such treatment, thereby affording a true case of development of a latent image produced independently of light, and independently of all possibility of reduction or any other species of chemical decomposition.

And finally, I may remark that the single experiment first herein described, seems to carry in itself the incontrovertible proof of the two points for which I have so long argued: the sensitiveness of pure iodide of silver, and the physical nature of the latent image.

LECTURE ON PHOTOGRAPHY.

BY COLEMAN SELLERS.

First Lecture, continued.

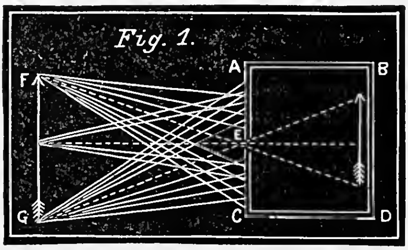
Mr. Editor: Reading your report of my lecture on Photography as published in your March number, there seemed to be some confusion. I find that the printer has caused the last to be first, and the first last. Please tell your readers to begin on pages 79 and 80; then read what is on 78 afterwards.

Yours, truly,
Coleman Sellers.

I have told you that the front of this camera is intended to receive the lenses used in making the picture, but in place of any such lens, suppose we cut a small hole in the centre of the front board, cover this hole with a piece of thin card-board, and perforate in the centre of the card-board covering, a small hole like a pin-hole. We then shall have a pin-hole camera, the camera in its simplest form.

To understand how we could make an image upon ground glass with such a camera and pin-hole, I shall have to refer you to a diagram.

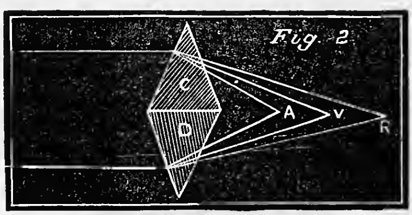
Fig. 1.



A B C D, Fig. 1, represents the section of a camera or dark chamber with a small hole in the centre of its front side, A C, at E. The arrow, F G, is the object whose image is to be formed in the camera. Light and its attendant actinism striking the arrow is dispersed, its rays are scattered in every direction, radiating from each minute particle of each part of the arrow. Some of these rays strike the front of the camera, as is shown by the lines, while only individual rays as it were pass through the little hole at E, and proceed on their course direct to the back of the camera, B D. There they

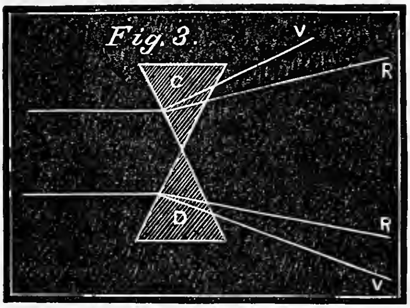
meet with the obstruction of the surface placed to receive them, and if that surface be white, the visible rays will be again dispersed, and pass to the eye of the observer as a visible image on the white surface. The image will, however, be inverted, as will be seen by noticing the course of the crossing rays of light. The nearer the screen, B D, be placed to the pin-hole, the smaller will be the image. Moving it further from the pin-hole, the image will be larger, but comparatively speaking equally distinct, with the one exception of loss of light, from excessive enlargement; the small amount of light entering being diluted down to cover the larger area. You have all no doubt seen on the ceiling of a darkened room the inverted images of the passers-by in the street, when the light came in through the crack of nearly closed window shutters. This is an example of a pin-hole camera on a large scale, the images being somewhat confused from the large size of the opening in the shutters.

If we put a chemically prepared plate in place of the screen at B D, then actinism, which is supposed to be always entering with the light, would fall upon the plate, and it would impress it to a greater or less degree, according to the intensity of the actinism. When the plate is developed, it will show an image, inverted the same as the visible image is. It will be quite as sharp as the visible image was, but will not be an entirely sharp image. Perfect sharpness could only be obtained by an infinitely small hole. The hole must be a mathematical point to effect this result. Too many rays are entering, they blur the image to the extent of the diameter of the hole, and though it looks quite sharp to the eye of the observer, it is sufficiently blurred to make it useless. But wherever we receive the sensitive image, it will be as sharp as the visible image. This, however, limits the utility of the pin-hole camera. If in place of the pin-hole we make a much larger hole in front of the camera, and in this larger hole insert an ordinary double convex lens of one kind of glass, like a burning-glass or spectacle glass, any glass in fact which will magnify the objects seen through it, we could then obtain a much brighter, clearer image than with the pin-hole. The image thus obtained, however, would have this notable difference from the former one: for each individual object to be seen on the screen, the screen must be moved to some fixed distance from the lens, called the focal distance of the lens. The nearer the object is to the camera, the further the screen must be moved from the lens. Should the visible image from such a lens be received on a sensitive plate, the developed image would not be sharp at all; it would be quite worthless. But a comparatively sharp photographic image could be obtained by placing the plate at some point (to be decided by experiment) nearer to the lens than the visual focus. In the early history of the art, cameras were all provided with a scale on the side, and the visible image having been obtained on the ground glass, the screen was then moved by the scale some fixed amount nearer to the lens, and the sensitive plate put in this new position. To explain this phenomenon to you, I would call your attention to the diagram, Fig. 2. The two prisms of glass, C D,

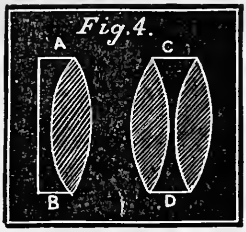


placed with their bases in contact, bear some resemblance to the sections of a double convex lens. I showed you some time ago that light entering such prisms was decomposed, some rays being bent more than others. This being so, the focus of the red rays will fall at R; the focus of the violet rays at V, and some of the actinic rays will come to a focus at A. Thus it is evident that wherever we put the screen, the image cannot be quite sharp, either for actinic rays or for light. The visible image at its sharpest will be fringed by the unfocussed colored rays. So with actinism, the image will be fringed with the unfocussed actinic rays of greater or less refrangibility. Lenses, however, without this defect, were produced in order to obtain a clear, coloress image, long before photography was thought of. Such

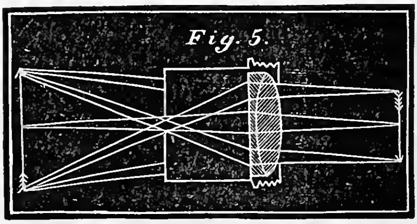
lenses are called achromatic or without color. By reference to Fig. 3, you will see



that if the prisms C D be placed with their apexes together, the rays of light entering will be dispersed, the violet rays being the most bent outwards, the red being the least bent out. If the prism of Fig. 3 be placed in contact with the prism as shown in Fig. 2, the one would neutralize the action of the other, and the effect would be the same as if a plane plate of glass was used. If, however, the prism of Fig. 2 be made of one kind of glass, say of crown glass, for instance, and that of Fig. 3 be made of flint glass, each having a different dispersive power, an image could be obtained in which nearly all the rays will fall upon one plane. Such lenses are made of various curves, as for instance at A B, Fig. 4, a double convex lens



of crown glass is united to a plano-concave lens of flint, or at C D, where a double flint lens is placed between two double convex lenses of crown. These are called doublets or triplets, as the case may be. When lenses, having their surface formed of portions of spheres, are used, their correction for color does not correct another serious trouble, called spherical aberration, the name applying to a defect caused by their spherical form. The image from such lenses cannot be received upon flat surfaces, but to be equally sharp over all parts must be received upon a curved surface like the inside of a watch glass. By uniting, however, two or more lenses of different curvature, this difficulty is overcome in a measure, and the greatest skill is required in making lenses in which both the spherical aberration and the chromatic or colored aberration are corrected. It is also asserted that lenses for photographic purposes must be differently corrected, to produce the best chemical effect, from lenses intended to produce the best visual effect, so different in degree of refrangibility are the light rays and actinism. Spherical aberration is also corrected in a measure by what is called a stop. Fig. 5 shows a plano-convex achromatic lens, provided with a stop, *i. e.* a hole in a brass plate placed some distance (usually the diameter of the lens) in front of the lens. This is a combination of the pin-hole, as it were, with the lens; the rays of light entering are restricted to those proceeding most directly to the lens, and although the whole lens is used in forming the image, yet those rays which would have to be excessively refracted are kept out. The stop has also another great advantage, for using



only the central rays proceeding from each part, a greater depth of focus, as it is called, is obtained. That is, near and far objects can be brought into focus at the same time: such a lens is called a View lens, in contradistinction to the kind used in making portraits.

Let us consider some of the peculiarities of the pictures made by the View lens. The image in the camera will be inverted, in the same manner as was explained with the pinhole camera. Objects on the ground will throw their image to the top of the plate, the sky will be seen at the bottom of the plate, and objects to the left will take their place on the right side of the plate, &c. You

observe the camera is a square box, and this plate which I hold in my hand has square corners, it has a rectangular outline, its proportion of sides being $6\frac{1}{2} \times 8\frac{1}{2}$ inches, and this size is called a whole size plate. (I will presently explain to you why it is so called.) All the photographs we are accustomed to see are rectangular, or may be, some oval, cut out of a given sized rectangle. The lens, however, does not make a picture of such shape; the lens is round, and the stop is round. The picture really made by the instrument is round also, but the round picture thus made is usually much larger than the box intended to receive it. The round picture is called the circle of light in the lens, and it is usual to express the value of lenses for certain purposes by saying that with a given focus, it gives such a sized circle of light; thus a lens with six-inch focus giving a circle of light twelve inches in diameter, is said to have a wide-included angle, and to be valuable for landscape purposes. From this circle of light the picture is taken, and it is taken from different parts of the circle for different kinds of subjects. A much larger square could be cut out of the circular picture, if the centre of the square be made to coincide with the centre of the circle. But this is not at all times admissible. The camera must, for view purposes, be set perfectly level; the centre of the lens will be the centre of the circular picture, and all objects on the same level as the centre of the lens will be at the centre of the circular picture. The exact centre will be the vanishing point of the perspective. Then, if the camera be placed on the pavement in a level part of the city, and a picture be made of the vista of some street, such as Prof. Morton will now throw upon the screen (in this case I have had a picture made to illustrate the principle, regardless of the beauty of the subject), you will observe that one half of the circle is filled with a representation of the cobble stones forming the pavement, that the vanishing point of the picture many squares up the opposite street is at the centre of the circle, and that the line of the roofs of the houses seem to point towards this centre. This is in exact accordance with the laws of perspective, with which laws I must presume you are all acquainted. If, from such a circular picture, we should cut a square or oblong picture, we would naturally select the part of the circle with the most houses and the least street, or in other words we would cut it from the most interesting part of the picture. This is done in the camera. The lens should be made to slide up or down in the front part of the camera. The sliding of the lens up or down is equivalent to sliding the sensitive plate up or down, and the picture is by this means selected from the best part of the circle. Sometimes we have to raise it so high as to make the circle cross the upper corners of the plate; in such case we must round the top of the picture so obtained, and thus make the best of the subject. The picture which is now on the screen is one taken from the top of the house; the camera was set level, and the point of sight is still at the centre of the circle, but the houses are all below the centre. One half the circle seems made of sky, the lower half contains the houses, &c. In such a case as this the lens would require to be lowered in the sliding front of the camera, and thus cut the picture from the lower part of the circle of light.

You no doubt have seen photographs of architectural subjects in which the buildings seemed toppling over, or sometimes the vertical lines seem to run together towards the top, making the building seem as if built out of plumb. In other cases the building seems wider at the top than the bottom. These faults all come from tilting the camera. The instruments used have had no sliding front, and the whole camera has been tilted either up or down as the case required to bring the desired objects into the field. I will show you on the screen pictures illustrative of this defect. The one now on the screen is of a building down in a valley; the camera has been on a hill, and has been tilted downward towards the object. The result has been as you see, a picture of a house wider at the roof than at the base. Now you see one in which the opposite effect is manifest. The lines which should be parallel seem inclined towards one another at the top of the picture. This illustration, however, shows another defect. You observe the lines are not straight.

They seem curved; this arises from a certain defect in the kind of lens used, and is called marginal curvature. The Globe lens of Harrison & Schnitzer, of New York, which has become so justly celebrated as a view lens, is remarkably free from this defect. This is a Globe lens which I have in my hand. You observe the lenses seem very much curved; their outside curves are in fact parts of spheres. This lens is capable of reproducing the marginal lines in copying a map or drawing, as correct as the original. This lens is used at the Coast Survey Office at Washington for this purpose, and many of the army maps have been photographed with this kind of lens, and are accurate enough to allow measurements to be taken from the copy. The Globe lens, however, has one defect, and that is its cost. To professional operators this is not so much matter, but to amateurs of limited means the cost is an object.

You must not, however, suppose that expensive apparatus is absolutely needed in the production of very pleasing pictures. I see now among my audience the familiar faces of several gentlemen who have produced charming pictures with cameras made of card-board, pasted together at the corners. The lens being the object glass (*i. e.* the large front glass) of an opera glass, with a pill-box stuck on in front, a hole punched in the centre of the bottom of the pill-box serving for the stop. Much ingenuity has been shown by those who desire to make pictures without the outlay of much money, and there must be a great deal of satisfaction experienced by those who thus produce good results with their ingeniously contrived instruments. I have said that view tubes are quite different from those used in portraiture. This instrument is one of Voigtlander's portrait tubes, called a quarter size tube. Let me tell you what is meant by these expressions of quarter size, half size, or whole size, as applied to lenses, and to the plates upon which the pictures are made. In the days of Daguerreotypes, a metal plate "$6\frac{1}{2} \times 8\frac{1}{2}$" was considered a very large affair, and received the name of whole sized plate, and the lenses capable of covering such a plate, were called whole size tubes; smaller plates of proportional sizes were called half and quarter plates. Their names have come down to the days of photography on glass, and other names have been added, such as extra whole size, mammoth, &c., but of late the lenses have been more commonly designated by their focal length, and plates by their sizes in inches.

Portrait tubes are made with large openings, large lenses, and are capable of taking in a great deal of light from the more feebly illuminated subjects in the glass-rooms. Such lenses, however, have not much depth of focus, or as it is called, not much "*reach.*" You have no doubt noticed in photographs of yourselves that while the nose and face seemed sharp and distinct, objects a little further back, even no further back than the ladies waterfalls, are indistinct and out of focus. This can be corrected by the insertion of stops between the lenses. This instrument you see is provided with a little slit on the upper side; through this slit plates having larger or smaller central openings, can be inserted at pleasure. It is by this means that the instrument is arranged with the full opening in taking pictures of children, or objects not easily kept still, while when time is no object, the use of a smaller stop will, at the expense of time, enable many objects, not in the same plane, to be brought into focus. It is often asked why instantaneous pictures cannot be made in the glass-rooms. Instantaneous pictures of out-door objects are taken with portrait tubes, not with view tubes, and are never of very near objects. If this portrait tube, which has not depth of focus enough to more than take in the amount required in ordinary portraiture, was to be used in photographing distant objects, it would be found, that exclusive of the foreground, which must be excluded from the picture, many squares in depth of a crowded street could be brought pretty well into focus. It is thus, with good chemicals, and lenses with large openings, that the instantaneous photographs of Broadway, New York, are produced by Messrs. E. & H. T. Anthony & Co.

It is an axiom in optics that light decreases as the squares of the distance. Thus, if with a given source of light, say the flame of a candle, we place a screen, say one foot square, at two feet from the light, we would

find that the screen would cast a shadow of two feet square on a screen placed four feet from the light, and if the second screen be two feet square, it will present an area of four square feet, or four times as much as the screen one foot square placed near to the light. If now both these screens be illuminated at their respective distances from the light, viz., the small screen at two feet distance, and the large screen at four feet distance, the small one would be four times brighter than the large one. The rays of light are diverging from the candle, and covering a larger space at an increased distance, are more feeble. But in photography these same screens as illuminated by sunlight, the effect is different, for they receive the parallel rays of light, and each thus becomes as it were by reflection original sources of light. The large screen, four feet from the lens, would form the same size image in the camera as the small one at the distance of two feet, but the effect from the large screen would be four times as intense as from the small one. This explains what is well known to photographers,—the nearer they bring the camera to their sitter, the larger they make the image, and the longer must be the time of exposure.

The best of the French lenses have a convenient arrangement, enabling them to be used either for portrait or view purposes. This lens is one of Jamin's make; it is now arranged for portrait work. But see, I can unscrew the back lens, turn the instrument around in its mounting, putting the front lens in towards the plate. Then screwing on this little cap, containing a stop plate and a small lens, I thus convert it into a very efficient view tube. These lenses recommend themselves to amateurs for their cheapness and application to various uses. I am happy to say that in Philadelphia recently there has been a lens devised to which in some respects there are a great many advantages. I am not permitted to say much of it, as it is going through the patent office. It does not look like the Globe lens. But it will enable us to take very sharp images with the use of a larger stop, and at the same time the glass is so thin that it obstructs very little of the actinism passing through, and with the same size stop, theoretically it should give a quicker picture, and it seems really to do so.

I have already taxed your patience for too long a time, or I should like to explain to you how the camera is used for making stereoscopic pictures. I can now only briefly say that the camera is provided with two lenses, such as you see in the instrument before you. The camera is divided by a central partition into two chambers. Thus two pictures at the same time may be made side by side on the same plates. Prints from negatives thus made, cut apart and reversed in mounting, that is pasting the right-hand picture on the left side, and the left picture on the right side, at proper distances, will show the stereoscopic relief when viewed through the prisms of the stereoscope. The stereoscopic camera and its fruits, are the favorites, and justly so, of most amateurs.

My next lecture will be on the photographic process. I will show you how to make a photograph.

WATCH-DIAL PORTRAITS.

Among the many valuable formulæ and processes given to the world as aids to or improvements in photography, none holds so high rank in our estimation as Frederick Scott Archer's collodion process, and next to it we place the collodio-chloride of silver process by G. W. Simpson, Esq., editor Photographic News, for, by the aid of both collodions, we are enabled to produce in a short space of time, what is generally conceded the most beauful positive picture now made; and the conscious pleasure he must feel in giving to the world so valuable a formula as the latter, is in striking contrast with what difference it would have been heralded to the world had some "cutting" Yankee discovered the formula. Perhaps, in a year or two, such a one will make himself known; instance the bromide swindle, now giving so much trouble to the photographers in this country.

It is well known with what ardor the American public will, for a brief time, support anything new or novel, and the printing of a flattering miniature face on the

dials of their watches is the novelty in photography of the present day. I do not claim the idea of photographing on a watch-dial, in fact do not know the author, but not having seen any method described, will, for the benefit of your readers, send you mine, as by it I have put from one to three heads on one dial from as many different negatives. After taking off the dial, or having it removed by a watchmaker, take a square piece of cardboard, half an inch larger than the dial, place the dial centrally on it, and press very lightly, just sufficient to make an impression of the pins that hold the dial to the watch. With a large pin, or other metal point, pierce through the card at the spots marked, place the dial on the card, gently pressing the pins through the holes. Now supposing you wish to put one portrait on, place a straight edge of cardboard over the dial so as to bisect the XII and VI, make a mark on the cardboard from the dial to the edge. Should there be lettering immediately under the XII, then draw the line to one side of the centre, now place the straight edge across the dial so as to cut about nine minutes on each side of the XII, and mark to the edge of the card; take up the dial and card, make short marks on the back to correspond with those on the front. These are to be the guides to aid you in placing the dial in its proper place on the negative. Remove the dial from the card, clean the face with chamois leather to free from dust, &c., flow over it a mixture of albumen and water in equal proportions. Coax off any surplus that hangs to the edge with blotting-paper. When dry, replace on the cardboard, and flow with collodio-chloride of silver; set aside in the dark to dry. While thus drying, prepare the negative by drawing a line with a pencil on each side, and in a line with the top of the head, also a line above and below the head, that would bisect the figure, if drawn through. Make a small vignette mask out of straw-board, one-eighth of an inch thick, and sufficiently large in surface to shield the dial from all action of light, except what passes through the vignette opening; fasten to the back of the negative with gum paper; secure the negative in the printing-frame. The dial being now ready place it face down on the negative, observing that the lines on the back of the card exactly correspond with those on the negative. On the card and between the pins lay a piece of the straw-board, thick enough to protect the pins of the dial from receiving any pressure. If not so protected, the dial might be injured. Place a piece of cotton velvet over the whole, taking care not to change the position of the dial. An ordinary stereoscopic plate and printing-frame can be used, taking the negative on one end of the plate. Block up one end of the printing-frame to the thickness of the dial and cardboard; let the pressure of the springs be light; by holding the frame in such a position as to lift the negative off from the dial, the progress of the printing can be examined with very little danger of moving the impression. When printed, wash, tone, and fix, as recommended for other collodio-chloride prints. Dry and replace on the watch. I use no varnish, as I think it best not to do so.

J. Carbutt.

Chicago, March 7, 1866.

Measles, How to get them, and how to get rid of them.

Having several complaints made to me of the occurrence of that dreaded and well-known disease, the measles, in various kinds of paper, I made a course of experiments specially to try if I could get the measles to appear in my prints, and then to try to get rid of them. I succeeded in doing both to my entire satisfaction, and think that my plan of *getting* them is the usual one, but not being generally known, causes those who are occasionally plagued with them to mystificate and worry considerably, and makes them try one random plan and another to get rid of them, like a canine with his head in a bag, and the more they try to get rid of them, the more they come. Now for the experiments. From an ordinary silvering solution, of strength of 40 grains to the ounce of water, take 1 ounce, and precipitate it with a solution of caustic potash, and afterwards thoroughly wash it free from all traces of lime, and allow it to stand over night. Then filter this except the oxide,

which leave in stock bottle, and when done silvering pour the silver back and shake it up and let it stand till wanted. Now, take three pieces of the same sheet of paper, and mark them 1, 2, and 3, and silver each piece one and a half minutes. Let No. 1 be silvered, dried, and printed in the usual way. No. 2, treat in the same way, and fume it ten minutes, and print. No. 3 should be treated in a like manner, fuming twenty minutes, however. After printing, No. 1 will be found yellow, No. 2 slightly yellow, and No. 3 purely white and clear. After toning, No. 1 will be found full of measles, No. 2 similarly affected, but not quite so badly, and No. 3 quite free from any attack of the disease.

In another experiment I placed part of a piece of paper between pieces of glass, to prevent the fumes of ammonia from reaching it, and fumed the other end one hour. I then printed upon and toned it. The end that had been fumed was clear and nice, while the parts protected by the glass had a severe attack of the disease described. In all these experiments, parts of the same sheet of paper were used.

My silvering solution is made as follows :

Nitrate Silver, . . .	480 grs.
Water, ...	16 oz.
Caustic Silver, . . .	30 grs.
Alcohol, ...	20 oz.
Aq. Amm., ...	48 drops

Fume 20 minutes or more.

It will sometimes occur that the paper is slightly damp when taken from the fuming-box. It should be thoroughly dried before printing. Some papers require more fuming than others, which can be ascertained by experiment as above. If the paper turns yellow, bronzes in printing, or tones harsh in the shadows (which latter is the case with all paper containing gelatine in the albumen), the strength of the silver solution should be reduced. By carefully regarding these statements, many who are vexed in this way may effectually stop such procedure on the part of the paper.

It is the treatment of the paper, and not the paper, that brings about such results as photographers are too prone to declare.

Jno. R. Clemons,
Manufacturer of Albumen Paper,
400 N. Second St., Philada.

VIEWS IN THE YOSEMITE VALLEY.

Every one has doubtless heard of the magnificent scenery of the Yosemite Valley, Mariposa County, California, and the wonderful views made there by Mr. C. E. Watkins, of San Francisco.

A mysterious-looking roll, having the appearance of a "sample of albumen paper to try, asking your opinion of it," was brought us by the mail a few days since, and upon opening it, was found therein *six* of these grand views, ready to unroll themselves and astonish us. At no time has our table been graced and favored with such a gorgeous contribution. They now lie before us, and as we unroll them again, we will endeavor to give a faint idea of what they are like; and *faint*, it must be, for no pen can describe such wonders of art faithfully. It has been said that "the pen is mightier than the sword," but who shall not say that in *this* instance, at least, *the camera is mightier than the pen?*

The first is a view up the valley, showing the *El Capitan* Mountain, which is 3000 feet high. This mountain presents its rocky side to us almost perpendicularly, and the same appearance at one end, which seems to have had a twin piece cleft away from it, leaving one corner of this giant rock almost at right angles, while another range hides itself behind. The great giant trees look like infants alongside, and those on top like mere shrubbery. Like a huge sentinel stands up *El Capitan* in the silent valley, defying any force to surmount it or remove it, and ever watching all that goes on beneath its dignified head.

The second is the *Bridal Veil*, 900 feet high, giving us a view of it from the Coulterville Trail. Here we have another grand mountain study, and being lower than the other, we are able to see the shrubbery scattered on its rocky sides, and at its base to find some magnificent tree studies. It is called the "Bridal Veil," because of the light aerial sheet of water that leaps from the top of the rocks to the valley below, spreading a beautiful veil of spray over everything in its course, and looking as soft and charming as the veil of the new-made bride, and making one quite as curious to

know what beauties are hid beneath it. What is behind this rocky height that modest Dame Nature would not disclose, we will not inquire about. It may be a gorgeous sunset, or it may be some grand composition of nature, creeping closely up to some sensitized plate, and "they twain become one," for the purpose of giving us another grand view as the fruit of their union. Mayhap the veil hides her blushes while the form of preparation goes on.

The third is *The Lower Cathedral.* Here we might rest and look an hour. Such a formation of solid rock, towering high up into the clouds, well-named *Cathedral*, cannot elsewhere be found, and we cannot describe it. Running up its rocky sides, we come to a point which looks more giddy than any steeple height, and once there it seems that the whole world might be viewed from it, and from there ruled and commanded. Where the altar, and where the choir sufficient to grace and to fill such an immensity, we fear the world cannot tell. Yet on one side we see the shadow of a still greater and higher mountain, whose fearful height no one can ever hope to climb. We never saw trees that were more successfully photographed. There seems to have been no wind, and the very best kind of light. Not a sign of motion is apparent, and the leaves can almost be counted. Along the rocky sides of the Cathedral, we see great pines hanging almost horizontally, as if to peep into the valley below, and at its base, here and there, we find such a daring monarch fallen, leafless, and dead.

The fourth is a view on the *Merced*, showing a part of that beautiful stream, full of sunlit rocks and saucy little cascades, and watched by a verdure-clad range of rocks that seem impassable. Here the foliage is also most successfully taken; everything sharp and clean. We get a nearer view of the mountains, only to make their perpendicular sides look more fearful and impossible of ascent, and seeming to say, "Thus far shalt thou go and no farther."

The fifth picture comes without any name, but is evidently another view on the same river. It combines three of the mountain giants, forming valleys, and between them a forest line of splendid trees. Being right on the shore, this whole beautiful panorama is reflected in the stream, leaving the white, smooth shore in the centre of the picture, and almost defying the casual observer to tell which is the reflection and which the real view, telling plainly how clear the water in the stream must be. With such magnificent air and light, and water and scenery, oh! what lover of our art does not sigh to be there with tripod and lens.

Lastly, we come to the *King's Mountain*, which Mr. Watkins has marked "One of my pets." We heartily sympathize with him, and with his permission will call it *one of our "pets;"* for we assure him, with due thanks and appreciation of the many kind friends who have helped fill our portfolio, we must say, and they would agree with us could they see them, that these views are the "pets" of the portfolio. No wonder that the artist calls this "one of my pets."

It is folly for us to try to describe. The pen is weak, and the camera great. Such mountains, the "King," in the foreground, and his subjects in the distance; such gorgeous foliage, ceasing their obeisance to their king while they creep into the camera a moment to kiss a shadow at the plate, we cannot describe. Each pebble on the shore of the little lake at the foot of the throne may be as easily counted as on the shore in nature itself. Each leaf stands out, each reflection clear and bright. By all means send to Mr. Watkins for a set of his views, and share our wonder and our delight. The views are 16×20, and came to us by mail in excellent order through our obliging agent, Mr. A. T. Ruthrauff, of San Francisco.

In a letter from Mr. Watkins, he says, "I have forgotten what I sent, but think the most of them were made with the Globe; King's Mountain and the Bridal Veil, I am sure, were. The horizon line in the picture of Mt. Starr King is from eight to ten miles distant, and the Bridal Veil is perhaps three-fourths of a mile. I use wet plates. This summer I shall make another trip to the Valley, and will send you a sample of what I do on my return."

After his next trip we shall endeavor to get more particulars from him.

POSITIVE DEVELOPMENT.

BY M. CAREY LEA.

SOME time since I found that a development bath, in which gallate of lead was substituted for gallic acid, had very marked advantages over the ordinary bath as to cleanliness, absence of spotting, regularity of action, and also in economy. I published my formulæ, which will be found at p. 27 of the first volume of *The Philadelphia Photographer*. M. Libois, of Belgium, adopted this process with slight variations, and published it by request in the Bulletin Belge, from whence it has been largely copied. An English translation which was reprinted in the "Mosaics" renders the weights incorrectly. A reference to M. Libois' original article showed the following to be his proportions.

Make a solution of 1 drachm of gallic acid in 4 drachms of alcohol, and 1 drachm acetate of lead in 12½ ounces of water. Then take

Rain water, ...	50 ounces.
Solution gallic acid, . .	½ drachm.
" acetate lead, . .	6¼ "

After mixing, add a little glacial acetic acid to redissolve the gallate of lead, which falls as a white precipitate.

This formula is almost the same as that which I gave, except that less lead salt is used. It will be seen that M. Libois' experience confirms my statement, that the addition of lead salt makes one-sixth of a grain of gallic acid to the ounce develop actively. It is not probable that this modification by M. Libois has any advantage over that which I originally published, and which is as follows:

For a twenty-four ounce bath, dissolve 4 grains of gallic acid in a few ounces of water, and add half an ounce of a 30-grain solution of acetate of lead; then enough acetic acid to redissolve a precipitate which is produced by the lead solution. Filter and dilute to 20 ounces. Dissolve a few grains of nitrate of silver in 4 ounces of water, and add.

Large prints will probably furnish enough silver to dispense with the addition of any silver solution, in which case the bath may be diluted to 24 ounces at once.

The process of M. Libois seems to be entirely based on that which I published in *The Photographer*. He follows my recommendation of using chloride to the exclusion of iodide and bromide for developing upon, but adds a little citrate of soda in the salting, to aid in obtaining perfectly clean whites. I did not experience this difficulty, but obtained pure whites on simple chlorides. He also confirms my statement, that many prints may be developed together in the same bath without injury, and finds that such a bath works in the same time which I named—about five minutes. He follows my recommendation to print a distinct picture before commencing the development, though he stops at the violet, whilst I prefer the chocolate, stage.

I take this opportunity to add a simple and useful method of cleaning the large glass or porcelain vessels used for developing in. In the paper above referred to, I recommended tincture of iodine, which acts extremely well, and has been tried by others with favorable results. Lugol's solution is also excellent. But an efficacious and cheap detergent is

Saturated solution of bichromate of potash, ...	2 oz.
Hydrochloric acid, . . .	2 "
Water, ...	4 "

All of these work perfectly well, and are to be preferred to the use of cyanide of potassium, which had been previously recommended.

I have tried this method of development upon negatives, and found it gave good results, except that a longer exposure was necessary, and the development was a slow one. I also found that for this purpose, nitrate of lead suited better than acetate. The details will be found at p. 117, vol. i, of *The Photographer*. I inclose to the editor of the Journal a print taken from a negative developed in this way.*

* The print alluded to by Mr. Lea, certainly shows well for the clearness and cleanliness of this developer, and the advantages of it are very apparent. ED.

THE CUTTING PATENT.

We did hope, that after our paper upon this subject in our January number had reached our readers, that we should be released from further queries concerning the "Cutting Bromide Patent." Sad to relate, however, such has not been the case, and we are almost overwhelmed with communications and queries upon the subject still. Some seem to think we have been "bought over to the interests of the owners of the patent," and that we should endeavor to say more for the cause of those who intend to contest the patent. In reference to the former modest suggestion, we would only state that the pages of this journal are not purchasable by any one, but are independently the property of all the subscribers who have paid their subscription, and who are the stockholders. Now we shall proceed to give some facts on both sides of the question, and add, that although we do this to please others, our opinion in the matter is *unchanged;* and we are glad to see that our venerable and esteemed co-worker, Dr. Towler, editor of Humphrey's Journal, sides with us. In a recent number of the British Journal of Photography we find a paper called "A Blow at American Photographers." In this paper the Bromide subject is fully discussed, and we abstract the following statements, which may be taken for what they are worth:

"On June 2, 1853, Sir J. W. F. Herschel read a paper before the Photographic Society of London, *on the substitution of bromine for iodine in photographic purposes.*

"Mr. Crookes, in an article communicated to the Journal of the Photographic Society, of July, 1853, *on the employment of bromine in collodion*, detailed his experience with it."

"And in another communication *on the sensitiveness of bromide and iodide of silver to colored light*, published in August, 1853, Mr. Crookes detailed with minuteness the effects of bromine when employed both by itself and in conjunction with iodine and collodion."

"In *La Lumière*, of the same date, M. Laborde made a communication on bromized collodion."

In a communication to the Journal of the Photographic Society, dated August 19, 1853, Mr. F. Maxwell Lyte gave a formula for collodion in which iodide and *bromide* of ammonium formed a part.

"In February, 1854, Mr. G. Berwick published in the same journal his method of making collodion, in which he employed iodide and *bromide* of potassium. In the same month Mr. Berry published a collodion process, mainly dependent upon the use of bromine in the collodion, and subsequently read a paper before the Liverpool Photographic Society on the action of the various iodides and bromides in collodion."

These cases are cited from printed books, which the British Journal says are accessible to every one.

We are, moreover, politely told by our English brother that before succumbing to the claims of the patentee, we should first consult authorities on their side of the water. We did not intend to notice his fallacious "blow," but circumstances seem to require it.

We also append the following letter, in answer to one of ours, from Titian R. Peale, Esq., a gentleman to whom photographers are much more indebted than they are aware of, and who ever makes it a special duty to defend them against any claims that may interfere with their rights:

WASHINGTON, D. C., Feb. 27, 1866.

MY DEAR SIR: Your note of the 26th instant is received. I answer your questions with pleasure, being fully aware of the excitement among photographers regarding the claim for the use of bromine in collodion,—patented by Joseph A. Cutting, some years since.

I was Examiner previous to the granting of that patent, and resisted its issue until the applicant gave satisfactory proof that he was the first to use the compound (April, 1853,) as claimed. No legal evidence has yet been shown to the contrary. We are bound to believe the patent is valid until it is proved to have been incorrectly issued.

A remedy was provided for such cases, by the 10th section of the act to promote the progress of the useful arts, approved Febru-

ary 21, 1793; and the 14th and 15th sections, act approved July 4, 1836; the first act being virtually annulled by the latter, of which a copy is sent to you by this mail. See also the 9th section, act approved March 3, 1837.

You may safely advise your readers not to waste their time or money in resisting the patent, unless they are well prepared to show that bromine in some form had been used in collodion, and was known to be in public use, previous to the granting of Cutting's patent. (He used it in April, 1853.)

Should you desire any particulars regarding the filing of Cutting's papers, they will be furnished on application, by note to the Commissioner of Patents, at the cost of ten cents per one hundred words payment to the copyist. T. R. PEALE.

EDWARD L. WILSON, Esq., Philadelphia.

We have written to the Commissioner of Patents, as suggested by Mr. Peale, but have at this writing no reply. Should it be important we will publish it in our next. Those who cannot wait can procure the information in the manner suggested by Mr. Peale.

He has told us all he can be expected to do, and will not be asked to answer any letters by our correspondents, as his time is valuable. A copy of the "Patent Laws" may be obtained by all who desire them. If we can find space, before going to press, we will publish the extracts alluded to. It will be observed that Mr. Peale's letter kills all the evidence produced by the British Journal, and should, we think, satisfy any one that there is no use of trying to resist the patent. If we can help them further, however, they will continue to write to us, and we will do all we can for them that is right.

THE COLLO-DEVELOPER.

THE British Journal, of 23d February, publishes a letter from Mr. Wenderoth, of December 20th, with remarks on the subject of the collo-developer, the same in substance to those which appeared in our pages. The editor remarks thereupon:

"So convinced are we of the great power conferred by Mr. Carey Lea's developer and of its simple and certain mode of action, that, for the last six months, it has always been made a point in class demonstrations to students at King's College, to show how much more easily and cheaply a negative can be developed by this method than by the usual one with plain aceto-iron, and subsequent treatment with pyrogallic acid or iron with silver. These comparative experiments are always conducted under the same conditions. A stereoscopic glass plate cut in two with a diamond, but the parts not separated, is collodionized, excited, and exposed as usual in a twin-lens camera. When taken from the dark frame, after exposure, the parts are separated, and both halves developed at the same time—one with plain aceto-iron, and the other with the same strength of protosulphate of iron (without acetic acid), to which a portion of concentrated ferrogelatine has been added. The plain aceto-iron never gives sufficient printing density at first, except under certain conditions, such as when using old decomposed collodion, or collodion made from pyroxyline containing nitro-glucose, dextrine, &c. The ferrogelatine, under almost any circumstances, is capable of giving sufficient density by the first application. In case of over-exposure, plain aceto-iron will cause fogging; ferrogelatine does not produce such an effect. On an under-exposed plate aceto-iron has no developing action after a very limited time; on a similar plate the action of ferrogelatine is long-continued and regular, for fresh details of the image which have not been brought out by the other will still be making their appearance after the lapse of half an hour."

THE GRISWOLD OPALOTYPES ON IRON.

I SEND herewith some pictures by my new process, which I hope you will have the kindness to exhibit to the members of your Photographic Society, who have most likely some curiosity to see them since your kind notice in *The Photographer*.

You will see that these pictures are an improvement upon those I had with me in Philadelphia, both in depth and tone; but

I say to you now as I said then, I claim nothing for them *as pictures*, but only as an illustration of the capabilities of a new process. I have labored under the misfortune of being so situated as to be unable to take my own negatives, and even my printing operations are conducted in a very small and inconvenient room, originally fitted up only for testing my Ferrotype plates. So much by way of apology for myself and my defective manipulation.

I believe that when a few of the minor details of the process are more thoroughly perfected, it will prove simple, pleasant in the manipulations, and thoroughly practical as well as cheap. This is, however, *my* opinion, and only susceptible of proof upon thorough trial.

The solution forming the film is transparent, like any collodion before being poured upon the plate, and becomes more or less of a dead or pearly white on drying, according to its preparation. When dry, I plunge the plate into an ammonio-nitrate bath (65 to 70 grains to the ounce) with a dipper, as in the ordinary collodion process. The plate remains in the bath from one to three minutes, according to the temperature, when it is hung up to dry. After being perfectly dry, it is placed in the pressure frame, and exposed as in any other printing process. After printing, and before toning, I give the plate a thorough washing, and then place it in a bath, two parts water and one part alcohol, slightly impregnated with salt, for the purpose of removing the unreduced silver, and thoroughly permeating the film, so as to insure equal action of the toning bath. I have toned by various formulas with equal success, and can name no one at present to which I give the preference. I, however, always add a little alcohol to both toning and fixing baths, for the reason above named.

When I have more thoroughly perfected these details, I shall take pleasure in offering you something more satisfactory upon this subject for publication. Meantime, if you find anything in this communication that you think would in the least interest your readers or the members of your Society, you are welcome to publish or to read what I have said.

I have forgotten to state that the picture, when toned and fixed, is covered with an enamel, which leaves it in the best possible condition for the reception of either oil or water colors, and which has been highly commended by distinguished artists.

Since writing the above, I have received your March number of *The Photographer*, containing a paper upon the subject of my new film, from Mr. Wenderoth, and shall prepare a reply to him for the April number. In order to show your members how unlike his enamel is to the one I have patented, I send also a bottle of my solution and some Ferrotype plates. Pour the solution upon the plate as you would a collodion film, and let it dry in the presence of your members. It should be coated in a *moderately* warm room, neither hot nor cold.

Very respectfully.
V. M. Griswold.

Mr. Edward L. Wilson,
Editor Phila. Photographer.

Communication from Mr. V. M. Griswold.

"I am Sir Oracle! when I ope my mouth, let no dog bark."

Peekskill, N. Y., March 4, 1866.

Editor Philadelphia Photographer.

Dear Sir: I am sorry to learn from the proceedings of the Philadelphia Photographic Society published in your March issue, that I have unwittingly and unintentionally in some manner "excited the bile" of one of your photographers, and a member of your Society. The only rational explanation of this attack that occurs to me, is the fact that I have recently taken out letters patent for an enamel for producing a white surface on the Ferrotype plate, and thus been in advance of Mr. Wenderoth, the injured party. He says, "About six months ago I made experiments to produce white enamel, of non-vitreous substances, for photographic purposes." I have good reasons to believe that Mr. Wenderoth's first experiments are of a much more recent date. Be this as it may, it comes with an ill grace from one whose work is by no means above criticism to speak so confidently of the work of others, who may reasonably be supposed to have

some ideas as well as himself, and especially is it unmanly and unkind, in view of what passed between himself and me at the interview which he mentions, and which under his treatment is as falsely colored as most of his pictures. If I had only *his* opinion of my process to sustain me, I should, if I placed any reliance upon it, at once break down and give up all further effort to bring it to the perfection which I feel confident it is susceptible of.

Mr. Wenderoth's remarks are calculated to convey the impression that I was travelling about the country, "putting on airs," strutting into studios and operating-rooms, exhibiting what *I* considered wonderful pictures by a new process, which after all *he knew all about.* It is a little difficult to learn from the spirit of his paper, whether he is most anxious to abuse me, or parade himself. You well remember, for you saw my pictures about the same time that Mr. Wenderoth did, that I claimed nothing for them *as pictures,* and only exhibited them as the results of a process which I believed had great capabilities. Whatever the merits of these pictures, Mr. Wenderoth's manner of speaking of them evinces too much assumption, and a large amount of egotism, which he would do well to curb somewhat, or rid himself of entirely, before he undertakes to instruct a profession, a large proportion of whom are his equals, and many of them his superiors. I put it to all candid minds, whether, if Mr. Wenderoth makes most decidedly bad photographs, and paints worse pictures, this is an argument against his process or the appliances he uses in producing them? I imagine not, for we are all aware that hundreds of photographers in the country produce by precisely identical means far better things than he does, and with possibly far less technical knowledge. By precisely the same reasoning as he applies to me, Daguerre himself could have been proven an ass, and his discovery moonshine.

Mr. Wenderoth says, "Before bringing out anything new, we should always be sure that it is superior to what has been in use." I retort upon him by saying, that before we talk so decidedly as he does, we should have at least, *a tolerably clear idea* of what we are talking about, and it may not seem a prompting of egotism in the present contingency for me to state to Mr. Wenderoth, that ever since the discovery of Daguerre, I have been a close student of all matters connected with photography, a large portion of the time conducting a gallery, and that I have acquired some reputation in photographic manipulations as well as an artist, and that I do not belong to that class of inventors "who look only for the patent, and have no idea of the real value of their pretended inventions." On the contrary, I have kept track of the wants of the profession, and have done much to supply them in various directions.

Nine years ago, or about the time I received my patent for the Ferrotype plate, I commenced a series of experiments for the production of a white enamel upon the Ferrotype plate for printing purposes, and among the very first was a modification of the process which Mr. Wenderoth recommends. I gave it up as worthless practically, for reasons quite obvious to any one who will try it, and experimented in other directions. During these experiments I produced very fine pictures upon an ammonio-nitrate collodion film, and some of these pictures are still in existence.*

My present white enamel, so far as its adaptability to printing purposes is concerned, was as perfect as it is now more than five years ago, but only within the last year have I been able to discover an enamel which would preserve the picture when taken, and at the same time not destroy the purity of the whites.

It is painful to be compelled to undeceive Mr. Wenderoth, who publishes with such confidence a process which he believes to be identical with mine, by assuring him that there is not only not the slightest similarity, but that I have gone over all his ground years ago, and found it as he has, to amount to nothing. If it was true, however, that the processes were identical, as he asserts he believes them to be, he places himself in a very unenviable position before the public

* I am happy to see this statement confirmed in a letter from my brother, in your March number.

in evincing such willingness himself to infringe my rights as the patentee of a new process, and in offering inducements to others to do the same thing. I am sorry also to say to him that he seems to have an unenviable itching to see himself in print, and is inclined, like many of his class, to arrogate to himself *all* knowledge connected with his profession, and becomes irate and presumptive towards all who pretend to possess original ideas also. He should remember that his blind attacks touch roughly and causelessly reputations and characters, perhaps, which it has taken years of careful honest study and labor to build up, and which neither himself or others as self-opinionated can be permitted to pull down as their splenetic vagaries may seem to them to justify.

Whatever may be the intrinsic merits of my discovery, the profession will before long have an opportunity to judge for themselves. If it is a good thing, they *will* have it, and if it is a bad thing, they would have rejected it, even if Mr. Wenderoth had remained silent, and the world would continue to revolve on its axis as usual.

In conclusion, let me advise him that he will enjoy better health, and make more money, suffer less from the megrims, and sleep better o' nights, make better pictures, and deserve better the title of gentleman, if before denouncing so confidently improvements and processes claimed by others, he takes some steps to convince himself that his deductions and inferences are correct, *and does not make an Atlas of himself*, by trying to carry the whole world of photography about upon his shoulders, when this same world see and know his weak points, and are laughing quietly at his puny efforts to *seem* a giant. "*Verbum sat sapienti.*"

V. M. Griswold.

We regret that a controversy should occur of so personal a nature between Messrs. Wenderoth and Griswold, and as they have now both had their say, and as this controversy can be of but little interest to our readers, we trust it will here cease. We have no objections to a free discussion of Mr. Griswold's or any other process, but we do dislike personalities, and it is our general rule not to publish them. We hope we will not be asked to do so hereafter, except as advertisements. They can be productive of no good. Ed.

THE STEINHEIL PERISCOPIC LENS.

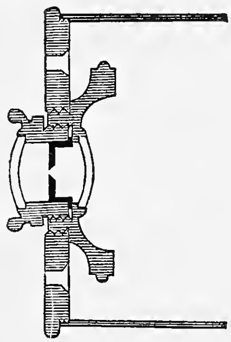
Much excitement has been created and much written about these new lenses.

The lens consists of two meniscuses, the hollow surfaces towards each other, with the stop halfway between them. The meniscuses are of one sort of glass only, and the corrections for figure and color are made by their peculiar curves and relative position. The combination is not corrected for the actinic rays, so that after obtaining the best visual focus, the sensitized plate must be moved in about one-forty-eighth part the length of the visual focus; but the exact amount can be determined only by repeated trials; which, when once established, may be marked upon the camera, and will answer always afterwards for landscape purposes, or rays practically parallel. It is obvious, however, that for the purpose of copying, or any other indoor work, this determination would be of no value, and would have to be repeated for every varying distance the object to be taken happened to be from the camera.

The time of exposure required for a No. 1 lens, lately experimented with, is not less than 2½ minutes, under favorable conditions of light, collodion, and developer; and, according to the catalogue, the same time is required for all the other sizes as for No. 1, with the exception of No. 6, which requires four times as long.

The negative given by this lens is very sharp and fine, and singularly perfect to the very edge of the circle of light, and without the least apparent distortion. When focussed by a powerful microscope the visual equivalent focus was found to be 2.92 in., and after repeated trials, the best actinic equivalent focus was determined to be 2.85 in. In this position the circle of light was 4.94 in. in diameter, which would determine the angle of view on the circle to be 81° 48′. The lens is 5-16 in. in diameter, and the stop less than 1-16 in. opening. A

section of the lens, full size, is herewith presented. It is believed to be nearly correct, with the exception of the interior curves and thickness of the lenses, which there was



no convenient means of measuring at hand. The stop is removable only by unscrewing the back lens of the combination.

These lenses are now offered for sale, and their qualities, sizes, and prices are as follows, according to the catalogue:

No.	Diam. of Lens. in lines.	Focus in inches.	Stop in lines.	Diam. Circle of Light. Inch.	Deg.	Price Prussian thalers.
1	$3\frac{1}{2}$	$2\frac{3}{4}$	0.7	$4\frac{1}{4}$	75°	16
2	5	$3\frac{1}{4}$	1.0	$8\frac{1}{2}$	105°	20
3	$7\frac{3}{4}$	5	1.5	$12\frac{1}{2}$	103°	28
4	10	$6\frac{1}{2}$	2.0	$15\frac{3}{4}$	101°	34
5	15	13	4.0	$24\frac{2}{3}$	87°	42
6	$22\frac{1}{2}$	16	2.5	34	94°	50
7	25	$21\frac{2}{3}$	6.0	34	76°	50

The above dimensions are in Paris inches and lines. The Paris inch is 1.066 English inch. The Prussian thaler is about 73 cents; but including duties (40 per cent.), exchange and expenses, it should be counted at $1.50, currency at the present time, for the lens delivered in New York. S.

PROVIDENCE, March, 1866.

On the Fading of Opalotypes, or Positive Pictures on White Glass.

BY F. A. WENDEROTH.

Of late some of those who have been making a certain style of opalotypes, have become convinced that they would fade; but as these pictures have charms not possessed by any other style, and as the public seem to appreciate them, I think it would be a matter of interest for the members of this Society to inquire if this cry of fading has a foundation, and what is the cause of it.

There are three distinct kinds of positive pictures on white glass. The oldest is the well-known developing process on bromo-iodized collodion, used mostly for transparencies. Of this we have never heard of fading, at least not as an unavoidable matter, but only in a few instances, which certainly originated in insufficient washing; and the pictures of this style which are in my possession now, and which I made seven years ago, have not changed, notwithstanding they had received no more washing than a negative.

The second style is a picture of which albumen chloride of silver is the base. To my knowledge, this process has not been successful in other hands than my own; and after more than two years practice and careful study, I hold myself competent to give an opinion as to its properties. When I first commenced to work this process, I reasoned, that as there was only a thin albumen film resting on an unabsorbing material, and not on a spongy absorbing paper, as much washing as would free a negative from the hyposulphite of soda, would accomplish the same on an albumen film on glass; but I think now that this conclusion was erroneous, as albumen, immersed in water, will swell and absorb it to a much greater extent than collodion, consequently requiring a greater amount of washing. In consequence of this misconception, some of my earlier pictures have become paler, but what is remarkable, have not faded, or what we call so in paper prints; they have become paler, uniformly, all over, without an abrupt disappearance of middle tints, and without showing yellow tints in those places where the black tints have disappeared. My pictures are produced upon the same principles as ordinary prints on albumen paper; and after fixing, are subjected to a two hours' washing in running water; and unless there be something in the albumen itself that will destroy the picture, these pictures must be permanent, at least as permanent as silver prints can be made; and I am prepared to guarantee them to be as permanent as paper prints.

The third style of opalotypes are on collodio-chloride of silver films, a process made public by Mr. G. Wharton Simpson, at a meeting of the North London Photographic Association, May 3d, 1865, and practised in this country since June or July last. It is of this style particularly that the cry of fading has been raised, and by those who have been practising it. When first published I gave it a fair trial, and obtained some fair pictures, but soon found that its results could not be depended upon with certainty; besides, the best pictures I obtained by it could not equal those made by the albumen process. A great drawback to this process is its propensity to blister, which will occur, no matter how much Canada balsam or castor oil is added, and sometimes after the plates had received a previous coating of thin albumen. This previous coating of albumen, in my opinion, is the seat of the evil; but it is not only necessary to keep the collodion on the plate, but it has great influence on the tone of the picture. Collodion which, without a previous coating of albumen, will give a gray, flat, weak picture, will give a strong, good picture on an albumen substratum; and I have found that the thicker this albumen film is, the better would be the tone of the picture. This shows that the silver in the collodion enters into combination with the albumen, which is farther proved by the picture showing distinct marks how and where the collodion was poured on. Now, in the process of fixing the picture, the hyposulphite of soda, being of great penetrating power, passes through the collodion into the albumen underneath, which is proved by the fact, that by an immersion of a few minutes, the plates are completely fixed; were it otherwise they would, after exposure to daylight, turn dark. But as collodion films resist water very strongly, it is a question if washing with water will remove the soda from the albumen film from underneath the collodion, and how much washing is necessary to accomplish it, or if there is anything in the collodion that will produce fading.

The general opinion in regard to this matter has been, that the same amount of washing negatives are subjected to, would be sufficient for this style of picture, the fallacy of which is proven by the one laid before you, which was made in September last, and which shows unmistakable signs of fading, notwithstanding it received one hour's washing in running water. Another picture laid before you, and made at the same time, shows no signs of fading, but I do not remember how much washing it received. Therefore, those who make this style of pictures should set to work, and investigate the matter thoroughly, or they will bring injury on themselves, and discredit to photography in general.

Some of the English photographers recommend for keeping the collodion on the glass, to cover the edges of the glass plate before coating, with a solution of caoutchouc, but in my hands this has not been successful.*

REPEAL OF THE STAMP ACT.

The subjoined communication, from one of the delegates who visited Washington to confer with the Committee of Ways and Means, will be of interest to our readers. The writer is quite sanguine of success, provided the efforts put forth in behalf of the project are properly followed up.—Ed.

It is hardly worth while to comment upon the action of the committee who had in charge the framing of the revenue tax laws. No doubt, for want of information, they fixed too severe a tax upon some articles of manufacture and probably not enough on others.

Now the "cruel war is over" and the national money market less stringent, it is a fitting opportunity and an imperative duty which the government owes to the people to relax its grasp upon all those departments of industry, especially the arts and sciences, that are now suffering unjustly and, we may add, needlessly from *over taxation.*

It is not necessary that we lengthen this communication by a defence of the photographic art as one of the best discoveries of the age, and which, more than any other, administers to the taste, refinement and culture of the people. It is, in fact, one of our household *necessities*, and anything calculated to hamper its progress or retard its

* Read before the Photographic Society of Philadelphia, March, 1866.

usefulness as the handmaid of the arts and sciences should be frowned upon and discouraged.

It is, we presume, very generally known by the photographers of the country that a memorial is now before the Committee on Ways and Means, in Congress, "*to repeal so much of the existing revenue laws as requires stamps to be affixed to photographs and other sun pictures.*" That memorial was published in full in the March number of *The Photographer*, and we will not reproduce it here.

It simply asks, that inasmuch as the use of stamps on photographic pictures is an insufferable inconvenience, constantly attended with serious injury and loss, by reason of the coloring substance on the stamps and the *ink* used in cancelling the same, "according to law," blotting, discoloring, and otherwise defacing the picture surface, and rendering the same unsalable and worthless, that their use be abolished. The delegation who waited upon the committee sought to impress this matter as first in importance, and asked the substitution of a more acceptable and less damaging way of contributing to the national treasury. So far as we could ascertain the judgment of the committee on this point it was highly favorable, and subsequent inquiry leads us to believe that a unanimous report will be submitted recommending the abolition of *stamps* on all photographic productions.

As to what conclusion the committee will reach, in substituting a manufacturer's tax, we cannot at present say, but if they will consider the facts laid before them we can hardly see how they can *impose* more than *three per cent.*, if indeed anything.

It will be seen by the figures annexed that upon all the heavy articles used in making photographs we are already paying a large tax, large enough indeed to exempt us from the payment of *any* on the manufactured article:

Let us compare prices now and 6 *years ago:*

	1866.	1860.
Alcohol, per gal., ...	$6 00	$0 75
Sulphuric ether, per gal., .	12 00	2 25
Acetic acid, 5 lbs., . .	3 50	75
Collodion, per doz , . .	19 00	8 00
Nitrate silver, per lb., . .	24 00	15 00
Albumenized paper, per ream,	45 00	23 00
	$109 50	$49 75

The above, which is a fair sample of the increase in the cost of photographic materials, is evidence conclusive that the trade is already bearing its share of the public expense, without *doubling* it with stamp duties or an equivalent therefor. It should also be remembered that photographers have *not* advanced their prices ten per cent. on the average, and cannot without serious injury to their business, and all must admit that they have a reason and a right to ask of Congress a removal of the stamp annoyance, and a generous reduction of the existing rate of taxation.

It is hoped that photographers in all sections of the Union will use every possible opportunity to impress upon their Senators and Representatives in Congress the necessity of this change in the revenue law. Write them earnestly upon the subject, if you cannot get a personal interview, and whenever the matter is brought up for action, as it soon will be, they will see the justice of our petition and vote accordingly.

G. H. Loomis,
Boston.

One very important thing Mr. Loomis has forgotten. The delegates who have this matter in charge have been, and will still yet be, under considerable expense, to say nothing of loss of time, in their efforts to carry this movement through. It is but just that these expenses should be *shared* by all those who are interested. We have personally made collections in our city, and publish a list of the contributors in our Specialties, as it is yet incomplete. If a real earnest effort is made *now*, we feel quite confident of success. If parties who are willing to inclose all they can spare for this purpose, we will see that it is carefully used, and if any overplus should be left it shall be returned *pro rata*. All such sums will be acknowledged herein. Unless a strong, earnest effort be made *now* all will be lost. There is no time to waste. Give liberally, and give soon; and we believe money will be saved by it.—Ed.

Newman's Manual of Harmonious Coloring—Lights and Skylights. Get it!

PHOTOGRAPHIC SUMMARY.

BY M. CAREY LEA.

GERMANY.

Yellow Light for Dark-Rooms.—Dr. Vogel recommends as a protection for the windows of the dark-room, to dip paper first in saturated solution of bichromate of potash and then in saturated solution of nitrate of lead, stating that such paper is so non-actinic that plates exposed for five minutes to sunlight passing through it received no impression. (A similar proceeding has been before recommended in England for preparing the canvas for dark tents.) *Mittheilungen.*

Carbon Process.—In *The Photographer* for May last, I described an entirely new carbon process, in which prints of bichromate and gelatine were soaked in water for 24 to 48 hours, till completely bleached, and when carbon was rubbed upon it, took upon all the non-exposed parts, but not on those which had been protected, so that a positive produced a positive and a negative a negative.

At a meeting of the Photographic Society of Berlin, of 22d December last, specimens of prints prepared in this way were exhibited, but without acknowledgment as to the author of the process.

Pin-holes—An Unsuspected Source.—It results from an investigation undertaken by Herr Krüger and Dr. Vogel, into the source of an inveterate disposition in the baths of the former gentleman to produce this photographic nuisance, that it had its origin in the presence of sulphate of silver in the bath. Further examination proved that the sulphuric acid came from some iodide of sodium used in the collodion, and which, with appropriate tests, gave clear indications of containing sulphate of soda, which was thus transferred to the negative bath. It was also ascertained that the nitrate of silver contained sulphate, in consequence of having been made with nitric acid which had been placed by the druggist in an insufficiently cleaned bottle. These two causes had led to the spoiling of twenty baths after a short use of each, and months of vexation.

The matter was further tested by adding a little sulphate of soda to a bath in good working order, when it immediately produced the pinholes. The same cause, it is found, may lead to vermicular lines on the film, a trouble occasionally noticed but never before explained. Vogel tried the effect of nitrate of baryta in restoring the action of baths that were disordered by containing sulphate of silver. A temporary benefit was thus obtained, but the nitrate itself tended to produce holes. Vogel remarks that *insufficiently washed pyroxyline* may be another source of sulphuric acid to the bath.

[The above is an important contribution to our knowledge on the working of the negative bath, and is well worthy the attention of photographers. I may remark here that in using the bichromate bath for cleaning glass, if the plates are insufficiently washed sulphuric acid may be thus also introduced into the bath, and tend to both pinholes and insensitiveness. A better treatment to have applied for removing the sulphuric acid than that of nitrate of baryta, would have been *nitrate of lead* in very small quantity.]

Vogel also remarks that the addition of baryta to the negative bath gives great additional density to the negative, but at the same time tends to hardness, and is of itself, after a time, a source of pinholes. *Ibid.*

ENGLAND.

Glass-Rooms.—Mr. H. P. Robinson, one of the highest authorities on the subject of artistic photography, expresses himself in the strongest manner against Sutton's tunnel plan, observing that he has within a year superintended the demolition of three glass-rooms, constructed in this way, and which proved failures, and that a case had reached his knowledge of entire ruin resulting to a photographer, whose means barely extended to the construction of such a room, and would not permit of altering it.

He advises a room in the proportion of 16 to 30 feet, not exceeding that size, and, if smaller, then in the same proportion of sizes. A ridge roof, 8 or 9 feet high at eaves, 14 at ridge; if possible, the length of the room lying east and west. On the long side, looking north, glass for about 16 to 18 feet in the middle from floor to eaves, leaving 6 or 7 feet at end, and this continued up the roof to the ridge. If nothing but portraiture is to be done, the two ends, the south side and the south slope of the roof, to be entirely

opaque, and as before described, the middle of the north slope of the roof, completing a little over half its length, to be glass, and continued down the sides to the floor. Wall paper, warm gray in tone. Whole floor carpeted; small pattern best; a maroon ground with a pattern in brown and black recommended. The top front light will generally illuminate the shadowed side of the face sufficiently.

[In England, one of the principal difficulties lies in insufficient light, and this is the great fault found with Sutton's system, especially in dark weather. In this country portraiture is undoubtedly more difficult than in England, owing to the hardness of the light, and therefore the appliances for softening it in the way of blinds and shades are required to be the more complete. It may be doubted if this mode of lighting is as good as either of those lately figured in this Journal.]

Mr. Robinson concludes by observing that all the most successful portraitists in London have glass-rooms which are approximations as near to what he recommends as the circumstances of the case have permitted. *News.*

Bromides in Collodion.—The use of bromide of potassium in collodion to increase its sensitiveness, was indicated in the supplement to Le Gray's work, published in June, 1850, nearly sixteen years since.

Br. Journal.

ITALY.

Printing and Toning.—Luigi Cocco describes his process, which he says gives effects similar to those of fuming without the trouble of that operation, and the advantage that the paper keeps better, as follows:

Dissolve 1500 grains nitrate of silver in 3 ounces of water, add 375 grains nitrate of ammonia, and as much nitrate of potash, both pure. Boil this solution a few minutes in a capsule, and when cold add 3½ drachms pure concentrated liquid ammonia. Then drop in solution of citric acid till the liquid is quite neutral, or, if anything, leaving it faintly alkaline. This liquid is to be filtered, and when wanted is diluted to ten times its bulk with water.

The author directs that the albumenized paper is to be floated 8 minutes in cold and 5 in hot, both of which are probably too long.

The proofs, after printed, he washes with water, then with five per cent. solution chloride of sodium, and tones with

Chloride of gold, . . .	30 grs.
Chloride of potassium, . .	37 "
Nitrate of potassa, . .	37 "
Bicarbonate of potassa, .	7 "
Water, ...	1½ oz.

A drachm of this to a quart or more of water. *La Camera Oscura.*

FRANCE.

Collo-developer.—Davanne has submitted the precipitate produced by the collo-developer to microscopic examination, and finds it to be very much finer in its particles than that produced by the ordinary developer. In fact, he observes, it is difficult to collect them at all. I have always remarked this; that portion of the precipitate that does not fasten itself to the sides of the vessel, remains suspended in the liquid almost indefinitely, with scarcely any disposition to settle.

POPULAR SCIENTIFIC LECTURES.

As briefly stated in our last, our citizens have recently been favored with two highly interesting and instructive scientific lectures. The first, a lecture on Light, entitled "Refraction, or Prisms and Lenses," at the Academy of Music, on Friday evening, February 16th, by Prof. Henry Morton, and the other, "On the World We Live In," by Prof. R. E. Rogers, on Monday evening, February 19th, at the same place.

Prof. Morton opened his lecture with an explanation of the term *refraction*, which we cannot do better than give below in his own words.

"Ladies and Gentlemen: On a previous occasion I had the honor of explaining to you how luminous bodies communicated that vibratory movement which constituted their light to the surrounding fluid in a series of waves, by which it was propagated in all directions, and conveyed to distant objects and places. This evening I propose with you to follow some of these waves as

they fly, and to investigate the nature of those changes they suffer when encountering dense but transparent substances, such as glass, water, and the like.

"In studying these actions we must confine our attention at first to a single series of successive waves, such as might in some sort be indicated by what is commonly called a wave line, and which we denominate a ray of light. This, as we have before seen by numerous experiments, proceeds in a perfectly straight line, unless interrupted in its progress, as, for example, in the following case: Suppose that a ray of light comes obliquely upon a dense body, such as a plate of glass; as it enters this surface, it experiences a bend or breaking of its straight path, and pursues its course within the glass in a direction more nearly perpendicular to the surface by which it entered than was its road before. On leaving the glass upon the other side, this action is exactly reversed, and if the two surfaces of the glass are parallel the ray is thus restored to its original direction.

"This action is called *refraction*, and by your permission I will endeavor, by the use of a simple illustration, to give some general indication as to its cause. First, however, I must premise that by careful and direct experiment it has been determined that light waves or rays are *retarded* in their advance through dense bodies.

"Let us, then, imagine that a body of troops was advancing obliquely across this stage towards the orchestra, and continued their march into the house. The foot-lights, the front of the stage, and also the seats beyond, present obstacles which would retard the *rate* of advance, as we may easily imagine, but what effect would this have upon its direction. Clearly this:

"Suppose the right file of the column first to reach the stage front, he would be retarded, while his left file would still be advancing freely, and in like manner with the rest of the line, which would thus be swung round, so as to advance in a direction *more nearly perpendicular* to the face of the obstruction than their previous course. The reverse of this would clearly happen in leaving such an obstructed region for clear ground, and an opposite and equal deflection would be the result. Thus is it with the wave or ray of light. Its front is thus swung round, and its course changed, by the process termed in one word *refraction*."

Certainly, no more happy illustration than this could be given of the subject, but the lecturer proceeded to illustrate this action by varied experiments, some amusing, some scientific and all beautiful and instructing.

An immense arrow of light was thrown on the screen, and then a piece of it cut off, as it were, by the interposition of a bar of glass.

A little aquarium containing living fish and plants was placed in the lantern, and an immense image thrown upon the screen. Salt water was then poured into the aquarium, and as it gradually mixed with the fresh, it refracted the light at all surfaces of contact, thus producing beautiful, changing, cloud-like shadows on the screen, and also causing a great commotion among the frightened fish, lizards, &c., which greatly amused the audience to see their singular acrobatic and gymnastic evolutions and contortions.

A fountain of crimson fluid was caused to flow in a tank of fresh water, which produced a jet of thirty feet in height with clearly outlined edges. The colors of the fluids were then changed with most beautiful effect. First, we seemed to be in the midst of thunder clouds and angry storms, then, as if by magic, the scene would change, and we appeared to be enjoying the wondrous beauties of a tropical sunset.

Clear water was then poured into an immense goblet, and by this singular law of light turned black as soon as received in the goblet.

The subject of the prism was now amply illustrated and explained by the lecturer with many beautiful experiments. A magnificent spectrum, ten feet in length, was thrown upon the screen, and also photographs of the solar spectrum and of different nebulæ, microscopic objects, and dissolving views of different kinds.

This part of the entertainment was most beautiful, and was greatly appreciated by the very large and enlightened audience. The whole lecture was a great success.

The lecture of Prof. Rogers can hardly

be described. The large stage was fully occupied by colossal apparatus, such as galvanic batteries, air pumps, telegraphic instruments, a magnet capable of lifting almost a ton, magnesium lamps, and a train of cars. One almost trembled at the idea of familiarity with such shapes and combinations of metal, wood, glass, and chemicals, but from mysterious wonderings, the lecturer, by his plain and frank explanations, brought us to understand all about them. His object, he said, was to prove that the forces in nature which appear to have been annihilated have only been transmuted, and that they cannot be annihilated. One variety of motion is converted into another. Thus we arrive at the indestructibility of force. He then showed the convertibility of the force that is called chemical. The sun, which is one hundred and ninety-five millions of miles distant from the earth, sends forth a force which develops all that is capable of growing. Thus we have reached two important points. First, that matter acts near; and second, that it acts at remote distances. An experiment of what is understood by chemical force was then shown. The article used was a small red balloon, containing, he said, two materials, one oxygen gas and the other hydrogen, which is the lightest of known substances. In this balloon we have the two gases. The force of caloric was then applied to the balloon, which in a few seconds caused it to expand so much that it exploded. By chemical action, materials that are associated may be induced to sunder, while those which are sundered may be induced to associate. By the admixture of one chemical with another, he turned black into white, and fluids into solids. He then gave some manifestations of force by means of the galvanic battery. Sparks were made to fly from a charcoal point in a glass jar. By a combined effect a beautiful and very effective light was produced. A light, nearly equal in intensity was also produced after water had been placed in the jar. By the aid of electricity he then set a miniature train of cars in motion, lighted gas jets with it, rang a bell, and sundry other curious things.

We were sorry to find, however, that the Professor was not better posted upon photography, for, in attempting to explain its mysteries to the audience, he gravely stated that the sensitized paper was placed in the camera, and by the light of the sun the light of our countenances were reflected upon it, which was another illustration of chemical force. We fear he has not read recent authorities upon the subject of our art. He exhibited a magnesium reflector, and burned some of the metal, explaining its uses. The smoke produced by this, he said, weighs nearly fifty per cent. more than the magnesium used. Some of the same substance was then burned in a glass receiver, resulting in the production of what is known as magnesia.

This planet on which we live is a mass of ashes of some former grand conflagration. Oxygen is all-powerful in its functions, therefore it is a powerful element. We all live and depend upon carbonic acid—water and hartshorn. The experiment of raising a young lad by exhausting air from a cylinder was then shown.

The Professor, in speaking upon atmospheric pressure, stated that every one of his lady friends present had a weight equal to fifteen tons pressing upon her delicate frame. The difference between the animal and vegetable kingdom is, he said, that the animal takes in oxygen, and throws off carbonic, while the vegetable takes in carbonic, and throws off oxygen. The power of producing all the wonderful manifestations in nature have been given by God to the great orb of light which we call the sun.

A number of experiments which we have not alluded to were shown to illustrate the various chemical changes. No pen can describe them. There did not seem to be the least impatience on the part of the audience during the progress of the lecture, while on the other hand they appeared desirous at the close, of seeing and hearing much more, and it is a gratifying sign of the times that such lectures are becoming more and more popular in our city, and we trust we shall often be privileged to have more like them.

CORRESPONDENCE.

[We have the following letter from Dr. Thomson:]

"Dear Sir: Your Vice-President disposes of my developer, in his paper, in your Journal, in the method so common with those who desire to express decisions without taking the pains to examine into the facts. If 'ferro-gelatine' delays or prolongs the exposure, how could I make an instantaneous negative of willow-trees, in November, after two o'clock, P.M., with an old bath?

"The imperfections in some of my negatives were those which any skilful photographer could see to have been caused by the mechanical presence of alcohol in the bath, which caused unequal development in the portion of the plate which was in the lower part of the holder.

"I send you a print made a few days ago, which, as you will see, if not instantaneous, is very quick, made with the same old bath, with a winter light, and a half inch aperture. The evergreens in the background absorb all the chemical rays, so far as I can perceive, but the black carriage and man have detail enough. This was made with the gelatine. After the opinion expressed by Mr. Wenderoth, I presume no one will care to attempt my method which is condemned without trial. Mr. Wenderoth pays his tribute to the process, however, when he says that the acetic acid 'prints' were the best, when in fact there were none sent.

"It is to be regretted, however, that the wet blanket should be so unhesitatingly applied to any effort to simplify the processes of photography, and particularly by a professional, who can alone be materially benefited by the voluntary labors of the amateur."

The negatives alluded to by Dr. Thomson were those exhibited at the January meeting of the Photographic Society. We think there is much force in his remarks, and sincerely hope that what he predicts in reference to the new developer, will not be realized. Every suggestion having at heart the good of the craft, is worthy of consideration. It is but justice to say that Dr. Thomson presented his paper and negatives before the Society with reluctance, as he desired to make further experiments first, but as we considered he had gone far enough to show much in favor of his modification, we urged him to allow them to be presented. The picture he sends is of card size, subject being a white horse and black man and carriage. It is all that could be expected under the circumstances, and more than could be secured generally. We sincerely hope those who have the time will give the thing a fair trial. If a success, a precious boon will be secured to the fraternity.—Ed.

Mr. Charles Waldack, author of Waldack's Treatise on Photography, Waldack's Almanac, &c. &c., of Cincinnati, in a recent letter, writes as follows:

"I have experimented somewhat with the collo-developer, and notwithstanding the great praise it elicits from almost all who use it, I must say that my experience is adverse to its use in the portrait room. It takes an exposure about one half longer than when the ordinary developer is used. This is the only objection against it, but it is a paramount one, when rapidity of impression is required. It may be used with great advantage in copying ambrotypes or daguerreotypes with faint shadows, or pencil sketches, engravings, &c. I see Mr. Wenderoth condemns it in portrait practice for the same reason, although with his new light he can give shorter exposures than any one I have yet met. I think the experiments of scientific photographers might be directed with advantage to finding a more sensitive film, or which is probably the same, a developer which will bring out the image with a shorter exposure than we have to give now. We all find it very disadvantageous to give long exposures, not so much for carte-de-visite negatives, as for imperials and larger size portraits. I think we have little to expect from optical instrument-makers, as it seems to be impossible to make large instruments working as quick as carte-de-visite lenses. I made a short time ago a few negatives by magnesium light. It is doubtful to me if it will ever amount to anything for portraiture, as the illuminating power of it is so much greater compared to the actinic power, that it blinds the subject. I tried several, and

found but one who by great exertion could keep his eyes open."

We know of no recent discovery that has met with such discussion at home and abroad, with so many modifications, and with such a diversity of opinions, as Mr. Lea's collo-developer. With all due respect for the opinion of those who honestly condemn it, we would say that the subject is of really so much interest that we should not condemn it *in toto*, but try modifications, and endeavor to discover what Mr. Waldack says we so much need.

His remarks are in a measure true respecting magnesium, but we think there is another great field for experiment, and we sincerely trust such will be made by many besides ourselves.—Ed.

Experiments with Mr. M. Carey Lea's Collo-developer.*

Desiring to make a fair trial of the merits of Mr. Lea's collo-developer for our own satisfaction, during the last week we made a large number of experiments with it, and have arrived at the following conclusion:

The collo-developer acts more rapidly than the ordinary iron developer, the high lights being very intense, flashing out the moment the developer touched the plate, but the middle or darker portions of the picture do not, in our experience, compare with the iron development in softness and delicacy of middle tints. A tendency to fog was frequently noticed in the high lights, when the development was pushed to bring out the middle tints.

We both experienced difficulty in making Mr. Lea's developer.

On adding the solution of protosulphate of iron to Mr. Lea's solution, a slight milkiness appeared, which filtered off entirely clear; but after standing twenty-four or forty-eight hours a bulky precipitation of oxide of iron was noticed; this was carefully filtered off, but the developer worked unevenly, giving a curious deposit in the sky, also quite streaky. Alcohol was added, which made it flow more evenly, but did not remedy the latter difficulty.

Many of our trials were made with a stereo box, cutting the glass before coating the plate. After exposure, breaking the glass, and developing one with the collo, and the other with the iron. One of the stereo plates with the above-mentioned deposit, with questions in regard to the precipitation of iron, was sent to Mr. Lea, who replied that he had never found his developer to give such results before, but suggested that some difficulty might occur from the iron used, asking a trial of some of his own. Another solution was at once made on Tuesday, at 3 P.M., which, up to this time, Wednesday, at 3 P.M., has not precipitated.

One more trial was made this morning with the fresh solution. A cut stereo plate was coated with collodion, containing iodide of am., 5 grs., bromide of cad., 2 grs., dipped in a new bath, which was known to work well. Exposed for thirty-one seconds on the Pennsylvania Hospital Square, with a pair of Jamin lenses, view adjustment, focus about 7 inches. The plate was broken, and developed; No. 1 with collo; No. 2 with protosulphate of iron 20 grs., water 1 oz., acetic acid 2 drs. The development with the collo came up quite fast in the bright portions, but slow in the shadows, showing decided evidence of fogging in the bright lights. The plate was at once washed, and No. 2 taken up. Ordinary iron was used; development rather slow, but uniform, coming up gradually. The developer was kept on longer than the collo, but no tendency to fogging was observed. The two negatives are here for your inspection. No difficulty was found in flowing this collo-developer, although no alcohol had been added, as in every trial made before.

In concluding our experiments, which have been made with a great deal of care, we are of the opinion that Mr. Lea's collo-developer is not in its best working quite equal to the ordinary iron-developer for landscape or portrait views. In regard to copies, we think the preference might be given to the former.

Further trials confirm the above in most

* Read before the Philadelphia Photographic Society, March 7, 1866, by Messrs. J. C. Browne and Hugh Davids.

points. Mr. Lea's developer was made on the 25th ult., from his formula, viz.:

Protosul. iron, .	1 oz. avoirdupois.
Water, . .	16 " fluid.
Mr. Lea's preparation,	½ " "

On first trial, 27th ult., it was found to work unevenly; 1 oz. Atwood's alcohol was then added, it was flowed then without difficulty.

The iron-developer was made as follows:

Protosul. iron, . . .	240 grs.
Water, ...	. 8 oz.
Acetic acid, ...	. 1 "

The collodion used was an excellent sample furnished very kindly by Mr. Wenderoth. We are about to experiment further in this direction. For further remarks on the subject, see Minutes Photo Society.

Since the above article was written, a marked precipitation has taken place of oxide of iron in the collo-developer made with Mr. Lea's iron. J. C. B.

Report of the Committee

Appointed to try Mr. Wenderoth's Preservative Solution or Varnish.

THE Committee appointed at the last Stated Meeting of the Photographic Society would respectfully report: That they have tried many experiments with Mr. Wenderoth's solutions for rendering waterproof water-colored drawings, &c., and find that everything claimed for it by him is correct.

1st. It will fix and render waterproof water-color drawings, without affecting the purity of the paper, or changing the tint of transparent or body colors.

2d. It will fix and prevent rubbing off of pencil crayon drawings, also charcoal sketches, provided the solution is first put on the back of the paper, and then on the drawing.

3d. It will not give gloss to dead surfaces.

4th. It will not change the texture of paper.

5th. Applied to glossy surfaces, it will not diminish their gloss.

6th. It can be used as a size, and applied to unsized papers, making them waterproof, and rendering them fit for water coloring.

7th. Mr. Wenderoth also claims that it will improve the keeping qualities of any kind of prints, photographs, documents, &c., by securing them against atmospheric influences, and that it will not crack or change color.

In regard to these two points time will alone decide, but we have no reason at present to doubt the claim.

One great advantage is that paper prepared with this solution will not contract, and may be colored without being stretched on a board.

In conclusion, your Committee take pleasure in recommending it to artists, photographers, &c., with the belief that it will be to them a valuable auxiliary.

JNO. C. BROWNE,
Chairman.
HUGH DAVIDS,
JOHN MORAN.

PHILADELPHIA, March 7th, 1866.

PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

PROCEEDINGS AT REGULAR STATED MEETING, WEDNESDAY EVENING, MARCH 7, 1866.

COLEMAN SELLERS, Esq., President, in the chair.

Minutes of last meeting read and approved.

The President then called for the report of the Committee on Varnish, which was read and adopted, and the committee discharged.

The President: I would suggest that a copy of the report before us be made and sent to Mr. Wenderoth.

Mr. Browne: I would say that a number of gentlemen have tried this preparation, and I have heard every one of them speak of it in the highest terms. They seem to think it an excellent article. Rev. Dr. Morton expressed himself as highly pleased with it.

The President: I would add to that, that I procured one bottle, and used it on paper which had been scratched, and it answered better than anything heretofore used to prevent ink from running. The only difficulty is, that it is rather expensive to use in the wholesale way we have to use it.

The election of members being next in order, Dr. William F. Norris was then balloted for and duly elected.

Mr. Tilghman moved to call up the resolution of Mr. Browne, in regard to the dues of non-resident members. After a free discussion upon the subject, it was resolved "That those persons residing outside of a radius of twenty miles from the city be considered as corresponding members, and as not expected to pay dues."

Messrs. Davids and Browne read a paper on Experiments with the Collo-developer (page 122).

Mr. Hurn: I have used the collo-developer many times, and with good success, my experience being that fully twenty-five per cent. in time was saved in the exposure of the plates. They were in every instance portraits. When little exposure was given, the development was rapid. I might use Mr. Lea's developer, if it were more easily prepared.

Mr. Wenderoth then showed to the members a negative made with Mr. Lea's developer without alcohol, and one with alcohol, and also one made with Rev. Mr. Miller's new developer, which he prefers to Mr. Lea's, giving a much stronger picture with about the same exposure.

Mr. Wenderoth exhibited five negatives, and prints from the first three plates, being comparative trials of the common Iron, Mr. Miller's new iron salt, and Mr. Lea's developer. The first plate had been developed with the common Iron and acetic acid; time of exposure, sixty seconds; a perfect negative in every respect. The second with Mr. Miller's, time of exposure, sixty seconds; slightly undertimed, dense and clear. The third, again with Mr. Miller's; time of exposure, seventy seconds, showing as much detail in the shadows as the first plate, but with more density in the high lights. The fourth, with a new preparation of Mr. Lea's, was full timed with sixty seconds, being in this respect an improvement on former samples, but wanting in density, and refused to flow evenly, developing in patches. To remedy this, a little alcohol was added, according to Mr. Lea's directions, which produced a multitude of opaque spots all over the plate, but being in other respects as the fourth plate. Mr. Wenderoth was of the opinion that to those who want dense negatives, Mr. Miller's new iron salt would supply their wants, with entire absence of fogginess.

Mr. Wilson: I will read a paper on a subject which is exciting much interest abroad, the Steinheil Periscope Lens. The only one in the country is in the hands of a gentleman in Providence, R. I. He has sent me a paper and a diagram of the lens. The print spoken of was made with a number one lens, which is $\frac{5}{16}$ of an inch in diameter. I also have a drawing of the lens.

The President: I do not know that any one of you have ever seen Mr. Zentmayer's lens. I have had the opportunity of experimenting with the first one he made, and also the second; the result is decidedly better than any one I have ever seen.

Mr. Wilson: I have also a parcel containing some of the iron pictures of Mr. Griswold, and also a paper containing his views, which I will read with your permission (page 110).

The President: At the last meeting I spoke of having had a large piece of machinery photographed by means of the magnesium light; many attempts had before been made to photograph it without success. I now submit this as a specimen of what the magnesium light will enable us to do. In taking it, the negative used was much too large for use. We wished to have it on about eight by ten paper, and the paper has been cut out, re-mounted, and then copied.

Mr. Browne: At the last meeting of the Society, I showed a negative taken with Mr. Follett's Excelsior collodion, containing no bromine; a view taken out of the window, appeared better than those made with collodion containing bromine which were taken immediately before and afterwards. I was curious to try it in making a portrait. Through the kindness of Mr. Wenderoth, I did so. We took two negatives of each, one was an exposure of thirty seconds, and the other of fifteen seconds. Mr. Wenderoth's, I found to be the most sensitive collodion. We compared every one of them, and the preference is in favor of Mr. Wenderoth's. The fifteen-seconds entirely broke down the Excelsior.

Whereas Mr. Wenderoth's was what may be called a well-timed picture.

Mr. Sellers exhibited a photograph of machinery printed on American paper. Its only fault was its excessive thickness.

The President: In accordance with the instructions to the Committee on the Library, a book has been procured, and the names of several works have been written therein. These names were to be submitted to the Society, and if they approved of them, the purchase was to be effected.

This book is in the hands of the Committee on the Library, who report the necessary purchases. They had authority to expend fifty dollars for books last year, and there was nothing done. Now they have a hundred dollars.

On motion adjourned.

OUR PICTURE.

It was our intention and promise to publish a photograph group of three little children in this issue, but the continually cloudy and stormy weather has prevented the consummation thereof. Until almost the time for going to press, we hoped that they would be ready, but at this writing the snow is falling, and the heavens look as if it might storm for a week. Not wishing to depend upon this fickle, windy month of March, we have substituted another picture, which had been laid by for future use. When the negatives from which it was printed were taken, there was much excitement pervading the whole land upon the *Oil* question. Many of our leading photographers were quite ill with the "oil fever," and we thought it would not be out of place to give those who were "buying oil stock," and who had never seen an "oil well," an opportunity of doing so. The "fever" subsided, however, and we laid our picture away, waiting, like many of the disappointed, for a revival of the excitement, before using it as our illustration. The present emergency seems to call for its appearance, and if any of our friends who still have "oil stock for sale" should have old hopes awakened, we trust it will do no harm, and it may perhaps help trade. The negatives were made for us by Messrs. S. G. & T. W. Rogers, of Carmichaels, Pa. Allowing the picture to speak for itself as a picture, we append a letter from these gentlemen, which gives all the information concerning its locality, &c.

"Carmichaels, October 3, 1865.

"Editors Philada. Photographer:

"We sent by Adams Express to-day the three negatives of the view of the Carmichaels Oil Well. This view is situated on Muddy Creek, about three miles from where it empties into the Monongahela River near Carmichaels, Greene County, Pa., and is about eight miles from the Dunkard Oil Works. The Carmichaels Oil Well is now over seven hundred feet deep, and has succeeded in getting some oil, but no great quantity. The Honeycomb Rocks in the background of our picture are a magnificent work of nature, as they are eaten out with saltpetre in the form of a honeycomb. The perpendicular height of these rocks is near fifty feet. We send you this description, that you may have some acquaintance with the situation of our view. We made the negative with a ¼ Voigtlander view lens, exposed thirty-five seconds.

"We hope the negatives will prove satisfactory. Wishing you success, we remain yours, most respectfully,

"S. G. & T. W. Rogers."

We were promised that we should hear when they had "struck oil," but have not yet received any such information.

It is one of many, and the well photographed here may be no better than many others that, after absorbing fortunes, refused stubbornly to make any return. We hope to present much more cheerful and cheering pictures for some months to come. This disappointment also delays a paper of some length which we had prepared on the subject of glass-houses or skylights.

We would like a few copies of the January (1865), number of this Journal. Parties sending them to us, will receive 75 cents for them, or Newman's Manual of Harmonious Coloring.

Salad for the Photographer.

Our Salad Bowl.—Those who are accustomed to partake of our salad are informed that more contributions must come from them, if they would keep up the supply. Throw into it little bits of experience, as they occur to you here and there, and help us make it acceptable and tasteful to all. Let it be well filled every month, and fear not to send an anecdote occasionally to serve as spice and oil for the rest, which may be heavier and more difficult of digestion. We can easily fill it, but wish you to do so.

The Reader says, "If there be an instance where *instantaneous* modern art, photography, may supply us with new facts, the seizing of the flashes of lightning by the camera will be none the least. The quickness of them, has been made a form of expression in almost all languages; still, art may be able to arrest and fix them permanently."

This is no unreasonable flight of fancy, as we learn from a recent French work that the first photographs were actually made by lightning, and why not photograph it? Among other glaring facts, it states that "in 1689, the lightning having struck the steeple of the Church of St. Sauveur de Logny, there was found impressed on the cloth of the altar the text of the consecration prayer, contained in an open book which lay close by. In 1847, at Lugano, a woman who had been near a place struck by lightning, had impressed on her leg the image of a flower growing close by. In the Bay of Zante, a sailor, who was killed by lightning, while sleeping on the side of a ship, had impressed on his left breast the number 44, which hung engraved on metal close to the place. In 1853, there was observed in the United States, on the body of a man, the imprint of a tree shattered by lightning."

If this erratic source of light can be tamed to creep into the camera box, and make our pictures as nicely as it writes our messages, what a joy it would be. Reach up photography. Rest not until you attain even this. Nothing is impossible with you.

A Good Suggestion.—A "thoughtful" correspondent of the British Journal suggests the formation of a photographer's beneficial society, for the aid of those in declining years, who have been useful to the art; and for the sick, and families of deceased members. A very good idea, indeed, for any country.

Mr. G. Wharton Simpson has been making some successful experiments in photography in natural colors. To one ounce collodio-chloride of silver he added two grains chloride strontium and five grains nitrate silver. A plate of opal glass was then coated with this, dried, exposed to diffused daylight until it assumed a deep slate-color. Several pieces of colored glass were then laid upon it, exposed to the sun, and the colors of the glass secured upon the surface of the opal plate.

"Jared" wants to know why a busy photographer can never hope to succeed? He says it is because he is continually standing in his own light.

The editor of the British Journal endeavors to explain by diagrams and otherwise how the "spirit" or "ghost" pictures, which created so much excitement and consternation here a couple of years ago, were made, and holds that the second image was produced by the *double refraction of the lens.*

If this be so, of course both images must be of the same object, but how is our worthy contemporary going to account for the fact that in this country we make Mr. Jones with a spirit of Daniel Webster, or some other statesman, in the clouded background, or at his side; Mrs. Thompson, with the spirit (?) of a departed child at her knee, or looking over her shoulder; or again, it may be a spirit image of some departed creditor appearing to the absconding Mr. Smith long after the latter thought his troublesome friend was in his grave.

This cannot be done by double refraction, for the images are entirely unlike. How is it done?

Editor's Table.

BIBLIOGRAPHICAL. — NEWMAN'S MANUAL OF HARMONIOUS COLORING, edited, with a preliminary chapter on the production of harmonious negatives, together with notes, by M. Carey Lea, in connection with various extracts from foreign and American journals on the subjects of lighting the sitter, and skylights. 1 vol. Paper, 75 cents. Cloth, one dollar. Philadelphia: Benerman & Wilson, publishers.

The reputation of Newman's Manual is world-wide among colorists. It is the most complete hand-book we know of. Mr. Lea has very much improved it by the addition of important and useful notes, and thus added much to its practical value. In his preliminary chapter he divides the subject into two parts or subdivisions: 1st. The proper lighting and posing of the sitter; and 2d. The mode of development of the negative, with a view to make it render as correctly as possible the character of the sitter, by avoiding actinic difficulties.

In the latter he treats upon "the sources of brilliancy," "application of these principles to drapery," "application of them to the face," "combination of drapery and face," and "the developer itself."

In the former subdivision, which really comes last, a series of excellent papers is given on Lights and Skylights, and how to manage them, illustrated by wood-cuts. The whole makes a most valuable little book, and should be in the hands of every growing photographer. It is gotten up in beautiful style, on fine white paper, and nicely covered and bound. A large sale is anticipated for it, of which it is certainly very deserving. Mailed on receipt of price, post free, by Benerman & Wilson, or by any dealer in photographers' or artists' materials.

THE YEAR BOOK OF PHOTOGRAPHY, AND PHOTOGRAPHIC NEWS ALMANAC FOR 1866. G. Wharton Simpson, editor.

This little year book comes as usual, full of matter of interest to us all, and of its usual size. The editor's name is enough to make it popular. Unlike the British Journal Almanac it has several extracts from American authorities, and admits that we do something for photography on this side of the water as well as those living on the Continent. Mr. Simpson is the inventor of the collodio-chloride process, and the Editor of the Photo News, a journal noted for its liberality and kindly feeling to all, both at home and abroad.

THE British Journal Photographic Almanac comes to us much enlarged and improved this year, and is full and overflowing with matter of interest. We notice several papers by our old friend, Mr. George Shadbolt, and contributions from Messrs. G. W. Wilson, England, Rejlander, and other noted authorities. It is about the size of our own Photographic Mosaics. While we compliment the Editor, Mr. J. T. Taylor, on his admirable selections, we are amused at his ingenuity in removing every trace of anything *American* in it, except such as has been contributed to the British Journal.

MOSAICS OF LIFE. Arranged by Mrs. Elizabeth A. Thurston. Philadelphia. J. B. Lippincott & Co., publishers.

This charming little book of Mosaics is composed of six elegant pearls, namely, *Betrothal*, *Wedded Life*, *Babyhood*, *Youth*, *Single Life*, and *Old Age*. By proper arrangement the fair authoress has made each one of these to vie with the other in their beautifully varied colors, making the whole book a perfect charm of poetry and prose.

PHOTOGRAPHIC MOSAICS.—To those who purchase books through their booksellers, we would say that *Photographic Mosaics* is for sale, wholesale and retail, by Messrs. J. B. Lippincott & Co., 715 and 717 Market Street.

REV. MR. HARDWICH'S APPEAL TO PHOTOGRAPHERS.—Not many persons in this country are aware that Mr. T. F. Hardwich, author of the celebrated and valuable work on Photographic Chemistry, is now laboring as a clergyman. No remuneration was ever given him for his labor among photographers, and he now appeals to them for aid in erecting *a church* in the colliery district of Hallam County, Durham, England. In a private letter to one of the editors of the British Journal, Mr. Hardwich asserts that in England, with all its boasted civilization, there is a class of men in some respects more benighted and barbarous than the savages of Africa, and it is for help to build a church among such a class of people that he now appeals to photographers. All disposed to aid this good cause may forward what they feel able to give, to the editor of this Journal, who will cheerfully acknowledge all such in these pages, and forward it to Mr. Hardwich direct. We trust that the debt we owe to Mr. Hardwich will at least prompt some response from our side of the great water.

Inner Rome: Political, Religious, and Social. 1 vol., 8vo. Tinted paper. Cloth. Rev. C. M. Butler. Philadelphia: J. B. Lippincott & Co., publishers.

It has been remarked that when we know the religion, politics, and social habits of a nation or people, we know all the rest worth knowing about them. The author of this work seems to give a frank and truthful statement of the doings in "Inner Rome," having resided there several years. The book is gotten up in most beautiful style.

Mr. Gutekunst's New Gallery.—Many fine improvements are being made in Arch Street, Philadelphia, and one of the finest is the new establishment of Mr. F. Gutekunst. We have not had an opportunity of inspecting the interior, which is not yet quite finished; but if we may judge from the outside appearance, the whole is going to be very fine. It is a few doors only above the old establishment, and is now occupied by him. It will be another beautiful monument to the prosperity of the photographic art of which Arch Street gives abundant testimony in the fine galleries of those beforementioned. Success to it everywhere.

Artists vs. Photographers.—We do not know when we have been so much amused as we were when reading a late issue of the British Journal, wherein two correspondents call our friend, Mr. M. Carey Lea, to task for attempting to "sow dissension" between the photographers and artists of the land of John Bull and London fogs; and one of them supposes Mr. Lea "forms his notions of English artists and English photographers from the artists and photographers in his own country." Were not the English journals sometimes, and often, fraught with the petty quarrels and pithy correspondence of "artists" and "photographers," who alone are guilty of "sowing" and planting "dissension," and who afterwards "dig about it and dung it," until it has grown to be a horrible pillar of fire between them, then Mr. Lea would have to plead guilty and beg absolution. As it is, however, these attacks are most laughable, amusing, and ridiculous.

We are happy to add that no photographer in our beloved land of stars, stripes, good photographers, and far-famed artists, indulges in such "notions" as are before alluded to.

Wilcocks is an enthusiastic and successful amateur photographer, and derives much aid from photography in his artistic compositions. The Morans paint their gorgeous landscapes and draw their unsurpassed charcoal-sketches, while another brother makes photographs of them, and saves the delay and expense attendant upon getting steel engravings made.

Schuessele accompanies Glover on his rural rambles, gathering up studies for his canvas with the camera box, thus making photography a near and valuable friend. Instances might be multiplied of this kind; and we ask, when have the pages of our journals been polluted by any quarrel between artist and photographer? Alas! that John Bull, "that genuine old fellow," who has been "so very liberal to the representatives of both arts," should be so blinded at what is going on at home as to attack his junior neighbors. It is his usual way, though, we are told.

The "Chemical News" (London), in noticing *Photographic Mosaics*, says, "This is for the most part a reprint of papers published in *The Philadelphia Photographer*, and, it is needless to add, mostly derived from English photographic journals. There are, however, a few original articles, by M. Carey Lea, Esq. To these we give every welcome, but we cannot help thinking it a little too bad to send to the English market a volume, consisting mainly of articles from English journals." Had we the time, space or disposition, we would reply to this disagreeable, untruthful snarl, at length, but we only wish to say that the first assertion made above is entirely false. Not more than one or two of the English articles reprinted in Mosaics ever appeared in the pages of this journal. We seldom have room for more than a summary notice of any English or other foreign papers. For this reason we were anxious such excellent papers should not be lost to our readers, and we published Mosaics. In selecting matter for it, we regret that in our file of the Chemical News we could find nothing worthy of *ex*traction, and this may be the cause of its *dis*traction, and the angry bark at our heels, which we consider in very bad taste.

The Philadelphia Photographic Society.—It is with great pleasure that we announce a growing interest in the meetings of this Society. It has held the position of number one ever since its organization, but is now prospering more satisfactorily than ever. Valuable papers are read, and interesting discussions held at every meeting, and it is no longer a waste of time to be present. A large appropriation for making additions to the library has been made, and the proceedings at the meetings are now reported in short-hand. All these show prosperity and interest, and we are glad to see this Society maintaining its reputation of being the best in the United States.

THE

Philadelphia Photographer.

Vol. III. MAY, 1866. No. 29.

OUTDOOR PHOTOGRAPHS TAKEN INDOORS.

In a paper lately written by our kind and good friend, M. Carey Lea, he says: "That now, an artist must be one in the highest sense of the word,—a creative artist,—or else be crushed by the Camera." This assertion caused us to meditate for a moment, but it was not long before we acknowledged its truthfulness, in our own minds. Never have we been so much *impressed* with its truthfulness, as while looking at the series of pictures noticed in our last, illustrative of Cariboo Hunting in Canada, from negatives by Mr. William Notman, of Montreal. We had before seen others do it, and had ourselves often tried, to make human nature in every-day life creep over our plates and leave its shadow there, and have looked at our unsatisfactory results despondently, yet hoping and believing that some one would yet bring photography up to that high standard of artistic attainments. Our expectations were large, but they have been more than realized; and we are led to hope for still more by this series of pictures. Nature has been caught—not napping—but alive! Out of doors has been brought indoors with the elements, and photographed in a group, yea! in a number of groups, and in different positions.

Each photograph is a picture, and each picture has a meaning. They are not merely specimens of delicate manipulation, artistic posing, and magical arrangement of light and shade. Each one shows the expenditure of time, brains, and talent. Each one tells a story, and the whole series combined give a truthful account of the sports, pleasures, and perils, of a Cariboo hunt in snowy Canada.

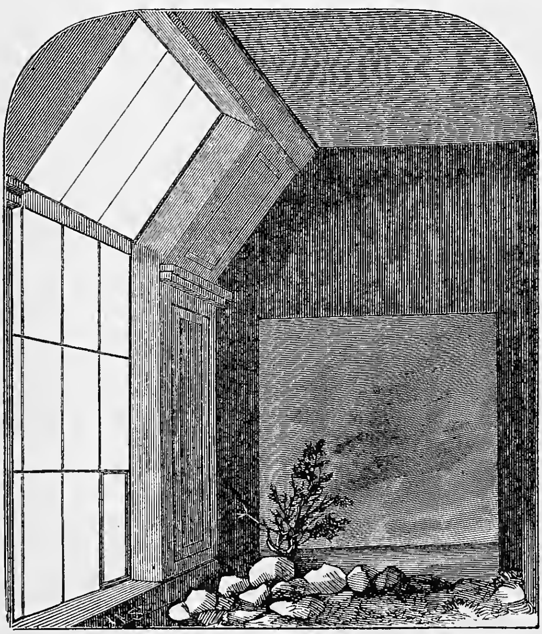
The first of the series is "The Hunter." Clad in his fur-lined clothing, armed with his snow-shoes and rifle, he stands knee-deep in snow, eager for the chase, as soon as the artist should release him. The hills in the distance will soon be covered by his tracks, now only known to the wild cariboo and its young. "The Guide" comes next, with smiling face, and with his sledge close by, laden with snow-shoes and other paraphernalia, and ready to lead the hunter through the pathways of yonder woods, and over those snow-clad hills.

In the next we find them "Going Out." They begin to look more like work, and are tugging up hill with snow-shoes on. The guide is behind the other, and finds his strong form none too strong to pull the laden sledge up through the deep snow. With bodies bent forward, and feet sunken out of sight, they seem to be toiling hard for their pleasure.

Yes! and in the next of the series we find one poor fellow who, more eager than the

rest, had gone on before, and lying down is entirely "Exhausted." The snow is falling down in great heavy flakes, and he is almost covered with it when his companions overtake him. The storm and wind were too much for him, and there he lies, while his companion is trying to cheer and revive him. In this picture, the effect of the falling snow is very novel and complete. We can only *guess* how it is done (a Puritanic right), for it must not be forgotten that these pictures are all made indoors; but that the artist has given us a remarkable photograph of a snowstorm without snow, we cannot deny.

"The Arrival at Camp" is the next in order, and here is a busy scene, and everything to do. Each man is a committee in himself to hunt firewood, build the fire, prepare the feast, or pitch the tent. All are busy and in a hurry to get through, for, as the next picture tells us, there is "Game in Sight." Here an anxious group, their old leader with field-glass in hand, are looking



far off into the distance (which is admirably effected by the arrangement of the background—a most capital one for the purpose), as there is "game in sight." Some have hastened at the signal to the door of the tent, and with their heads peering out, make a most interested and naturally arranged group. The distance in this picture is not excelled by any other in the series. It is admirably effected, though not greatly superior to "A Chance Shot," which comes next in order, and which is the one we are pleased to present with this to our readers, thus giving them a better opportunity of judging of these pictures than any description of ours could give them. It will speak for itself, and we pass on to the next, which is called "The Camp Fire." This is a picture which could not have been made a year or two ago. After an exciting day, our heroes have seated themselves upon the ground to tell the adventures of the day's chase. The pipe is in nearly every mouth, and a happy, contented-looking group are they. That it is night, no one can doubt when looking at the picture. The only light is from the fire in their midst, and this fire is magnesium light. This is a little wider field than has before been attempted by photography, and is a decided success. "The Hunters Resting," is what its title indicates, representing the group at rest, probably telling stories of former adventures "Sunday in the Bush," is another admirable picture. There seems to be a general cleaning up going on, such as many of us have experienced on Sunday in the field; and one burly hunter sits stripped naked to his waist, washing himself, apparently indifferent to the cold wind playing around him. All seem to be glad of a "day of rest," and glad enough to keep it sacred, so far as abandoning the chase *pro tempore* goes. Leaving them to their pleasures a while, our last picture represents them "Returning." Laden with game, they are homeward bound, well pleased, no doubt, with their adventures and their success.

Though some of these are superior to the others, in every case Mr. Notman has succeeded wonderfully in bringing his pictures up to the true natural meaning of their titles. They are not such pictures as an

artist once painted, and who, upon being asked the subject, said it might be called the "Three Graces," or the "Holy Family," "vichever you blease," but the subjects have been selected from the cariboo hunter's life, and the pictures made to faithfully represent their subject. It is very easy to take a number of figures, arrange them in certain positions, introduce certain accessories, and then photograph them, and give them a name; but such has not been Mr. Notman's plan, but quite the reverse. To make these pictures, trees, rocks, snow, tents, air, light, fire, men, backgrounds, cariboos! had to be brought in and arranged to suit the chosen subject for the picture. Patience, artistic taste, knowledge of nature, and, above all, study and *brains*, were required to make them, besides nice manipulation. Every photographer should deny himself, and buy a series of them for study. They will give him something to think about and aspire to.

Above is a diagram of the skylight in which these wondrous effects were produced. The light is due north, and in making sittings the sitter usually faces the west. In this way either side of the face may be taken, as the operator sees best. It is used specially for such pictures, we believe. It is 34 feet 6 inches long; 18 feet 6 inches wide, and 16 feet 6 inches from floor to ceiling. The side light is 9 feet wide, and 10 feet 6 inches from the floor to the inclined toplight. The latter is 9 feet wide and 5 feet inclination, or in depth from the top of the side light to its own highest point. The figure shows the kind of background used, though that may be more plainly seen in our picture No pains or expense have been spared to secure these results, and we have never seen anything more successful and true to nature, without being wholly nature itself. Oh! what a future is there for photography! Plenty of room left for improvement yet. May its votaries never cease in their efforts to bring it up to its highest attainments.

Mr. Notman is working another series of pictures, which we shall notice in future. We also hope to present a specimen of his popular portrait work, together with a cut of his regular portrait gallery.

ON PHOTOGRAPHIC PERSPECTIVE.

BY M. CAREY LEA.

PART II.

In the first part of this paper, I examined the general principles which govern the subject, and endeavored to establish this important principle, viz.:

That the image of an object or a set of objects given by a lens is the same as that furnished by a perspective drawing when the eye takes the place of the lens, and the projection plane is placed exactly as far in front of the eye as the focal length of the lens. And further, I endeavored to show that whilst this is true for combined lenses stopped in the middle, or at least with a very close approximation, it is not necessarily of a meniscus lens stopped in front, or, in fine, of any lens or combination of lenses in which rays passing through the optical centre did not pass to every point of the image. That with such lenses the perspective is more or less incorrect in every part, except in a small central circle, for the exact determination of which I gave a formula.

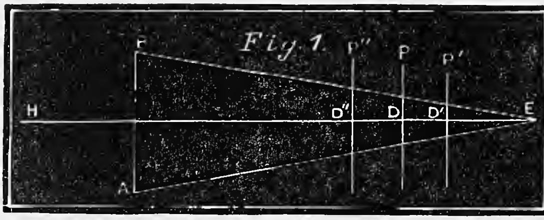
It seems scarcely necessary to say that in this, as well as in the foregoing paper on the same subjects, the focal length spoken of is always the absolute or equivalent focus. There is, in some forms of a lens, a non-coincidence between the vertex of the emissive cone of rays and the optical centre of the instrument. This difference, where it exists, is unimportant in the point of view from which I am considering the subject, and to introduce it here, would be to unnecessarily encumber the explanation, though I may have occasion to advert to it before concluding.

From these general principles there flow results which merit a closer examination, and which lead to considerations that will enable us to get a very clear insight into the relations which exist between all possible representations of any object or set of objects as produced by lenses of various foci, and placed at the most different distances from the object. These cases may advantageously be divided into two distinct heads

1. *Where the station-point is fixed and in-*

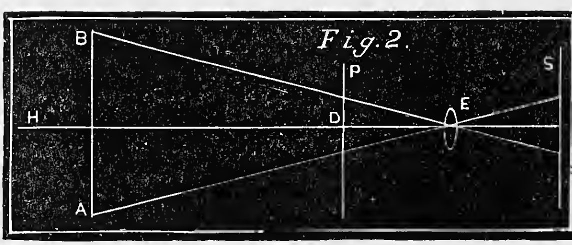
variable. That is, where, placing ourselves in one determinate position, we examine the results obtained by lenses of all possible focal lengths.

2. *Where the dimension of a given object is fixed*, and where the position in which the camera is placed is so regulated in connection with the focal length of the lens that that dimension remains invariable. For instance, let us suppose a flag-staff to be raised in the centre of the view, and that we take the picture, regulating the distance in proportion to the focal length of the lens, so that on the negative, this flag-staff shall always have the same precise length, irrespective of the size of the picture.



It is evident that these two cases embrace in themselves all that is necessary to clearly define our conceptions of the influence of lenses upon the images which they afford under the most varied circumstances.

First, then, we take the case of a fixed station-point. From a given point, a given window, let us say, we examine the comparative views of exterior objects, with lenses of all focal lengths. We preferably choose architectural subjects, because the vertical and horizontal lines, and the groups of parallel lines enable us to observe and speak more exactly of the effects produced; but the principles hold precisely both for rural landscapes and for portraiture.



If we examine Figs. 1 and 2 of the first part, and return to the principles there laid down, we shall see that the camera image, S (Fig. 2), corresponds with the projection image, P D, and that, therefore, with a series of lenses of different focal lengths, we shall get a series of images corresponding to projection planes, P′ D′, P D, P″ D″ (Fig. 1). Our question, therefore, resolves itself into considering, *what are the relations which exist between the images of the objects as formed on these projection planes*, for the images of the camera will be identical with them.

Let us imagine that, standing at an open window, we hold a plate of glass in our hands, and sketch on it all the exterior objects as seen through it. That we then move a similar plate nearer to the eye, and repeat the operation, and so with one more distant. By considering the similar triangles at Fig. 1, we shall see that we obtain in each case precisely the same picture, except that the *scale* is enlarged or diminished.

This is a most important fact, and leads to various points of interest. It follows that if we take a picture with a lens of a given focal length, and examine it with a perfect magnifier which doubles the linear dimensions, that magnified picture is identical with one taken by a lens of twice the focal length of that originally used.

It follows that if we take a small picture with a short focus lens, and enlarge it by means of a perfect copying camera, whether we enlarge from a print, making an enlarged negative, or whether we make an enlarged positive from the original negative, the enlargement is identical in all its lines and dimensions with a picture originally taken by a lens of long enough focus to produce a picture of the size of that enlargement, *the lens being placed upon the same spot*, as was the lens that actually took the smaller picture from which the enlargement was made.

The same is true of reductions. And with both enlargements and reductions it is true

for all correct modes of making them. Were we to copy with the pantograph, or by reducing or enlarging by scale and measurement, the result would still be the same.

I have said that when pictures are taken from one and the same station-point by lenses of different focal lengths, the images *differ only in scale*. If this is true, *the perspective angles must be identical in all*, and they are so. And here at once some very subtle considerations present themselves. If long and short focus lenses give the same angles, why then do we speak of the painfully sharp angles of very short focus lenses? The answer to this is twofold.

1. This equality of angles is only true when the views are taken from the same station-point, and with a long focus lens we naturally go to a greater distance to include the same subjects. The consideration of this part of the subject belongs to a different part of this examination, and we therefore pass at once to the more important answer.

2. It is an incontestable fact that the eye supports, and is satisfied with angles in a large picture, which it will not tolerate in a small one. In fact the deception to the eye is so complete, that nothing but actual measurement, or at least, practised observation, will convince of this truth. It is, however, one that is perfectly well recognized by artists. An architectural picture of large size, in which the perspective is correct and pleasing, when reduced exactly to scale by a copying camera, or by scale-drawing, becomes wholly changed in character. The angles, especially the front upper angles which appeared correct and harmonious in the large picture, appear sharp and distorted in the reduction. Engravers know very well that large pictures of buildings cannot be very greatly reduced without being utterly ruined, the effect destroyed, and the whole character altered. Mr. Ruskin, whose authority upon a point like this will not, I presume, be challenged, observes, "The conclusion is one of great practical importance, that though pictures may be enlarged, they cannot be reduced, in copying them. All attempts to engrave pictures completely on a reduced scale are, for this reason, nugatory. . . . Good painting, like nature's own work, is infinite and unreducible." And again, "all drawings of objects on a reduced scale are, if rightly executed, drawings of the appearance of the object at the distance which, in true perspective, reduces it to that scale." From all of which it clearly follows that to obtain a correct *small* picture of an object, the reduction in size must not be accomplished by using a short focus lens, but by taking one of a proper focal length to a distance such that the object is thereby reduced to the size desired: unless intervening objects render such a course impossible. I mean that if we want a picture of three inches by four of an object, we shall not do well to use a lens that gives images of that size, but we should take a lens of longer focus, say an eight-inch lens, and go to a distance such that the object is brought into the required limits. With natural scenery very pretty pictures are often obtained by these short focus lenses. But they are incorrect representations; the only difference is that the eye cannot detect, as in the case of architecture, the faults that have been introduced, unless previously familiar with the scene depicted.

It is not improbable that some of my readers may doubt the fact that I have here so positively affirmed of the equality of the perspective angles produced by different lenses of different focal lengths when taken from the same station-point. It is common to speak of the sharp angles produced by lenses of short focal lengths, and those views which we are accustomed to see produced by short focus lenses are habitually taken from station-points too near the object. So that two causes concur to make these sharp angles painful, first, that they are rendered additionally sharp by being taken from too short distances, and second, that short focus lenses produce small pictures in which, as above explained, the eye refuses to tolerate sharp angles.

But this equality of angle given by lenses of different focal lengths from one position is susceptible of experimental proof, which proof I have carefully verified. Although the mathematical demonstration appeared to me in itself to be perfectly conclusive, I thought it desirable to ascertain if it held true of the lenses which we habitually use.

I, therefore, took successive views of the same object with two lenses of very different focal lengths, placed in absolutely identical positions, and taking, as an object, a building peculiarly well suited for the purpose. Prints from the negatives were mounted on a sheet of paper, the vanishing-points of the lines were determined, and the angles of the two pictures were found to be the same to a hair's-breadth, although the effect of the two pictures was extremely dissimilar. The vanishing-points, of course, were different: this indeed essentially follows from the fact that pictures on different scales showed the same perspective angles.

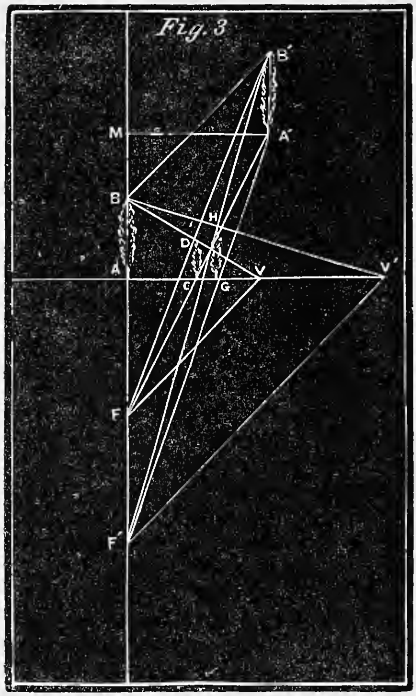
SECONDLY, we pass to the consideration of the other case, that in which several pictures by lenses of different focal lengths are so arranged by varying the distance that the dimension of a given object is the same in all. We will take a poplar tree in the foreground, and make its height equal in all the pictures.

This method of comparison will be found to bring out the characteristic differences amongst lenses far more strikingly and effectually than the first method of comparison.

For, it will be found that when two lenses of different focal lengths are so adjusted that a given object or rather any given line has the same actual size in both, *this will be the solitary identity in the two pictures;* everything else will be different. The magnitudes of no other objects will correspond, the perspective angles will be different, and in fact each picture will then bear the characteristic stamp of the lens that produced it.

Our next inquiry will, therefore, be: supposing that two lenses of different focal lengths are so placed that a given dimension is equal in the two pictures, what law will govern the size which any other dimension will have in each?

Let us suppose that a poplar tree stands in the centre of the picture, that is, directly before the eye, and that another of equal height stands to the right, and further back: for simplicity let us say that it is as much further back as it is to the right. The line joining the two will then make an angle of 45 degrees with the line of sight, that is, in fig. 3 A M is equal to A′ M. Also, we can simplify the figure and construction by supposing that the base of each tree is on a level with the eye.



The tree, A B, has, by condition, the same height as A′ B′, but the latter being farther will be represented smaller in a perspective drawing, and the amount of this reduction *is wholly dependent upon the focal length of the lens.*

Let us take A F to represent the focal length of any lens. Then determine the vanishing-point of the line connecting the two trees by drawing F V parallel to A A′, the intersection of F V with the line A V′, perpendicular to the line of sight, F′ A, viz.: V, will be the vanishing-point. Draw the line B V, and connect F with A′. At the point C where this last line cuts A V erect a perpendicular till it intersects F B′. The length, C D, of this perpendicular will be the comparative height which the distant tree will have, as depicted by the short focus lens, the nearer tree having the fixed height, A B.

Let us take A F′ to represent the focal

length of a lens of twice the focus of the preceding. The new vanishing-point V′ is determined in the same manner as before. Connect F′ with the top and base of A′ B′, and in the same way as before determine the height, G H, of the tree.

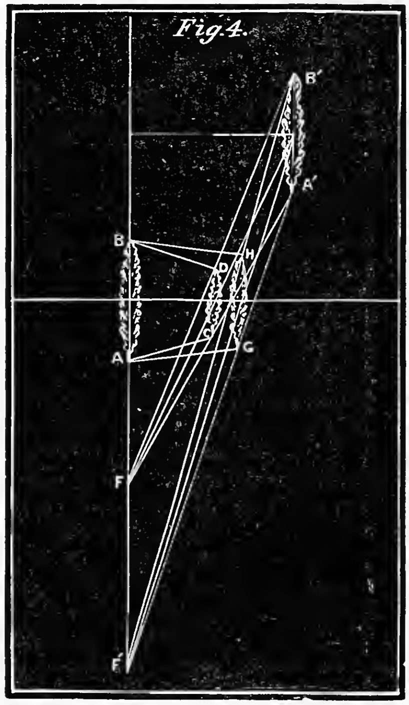
We see, then, that the two lenses being so regulated in distance, that both give the nearer tree the same height, A B, the more distant tree is reduced in height by the shorter focus lens to C D, whereas the longer focus reduces it only to G H.

The difference of these two heights is very striking. But this is not all; everything else, as I before remarked, is changed. The lateral distance, M A′, in actual dimension, is reduced by the long focus lens to A G; by the short focus, still more, and is brought in to C. The perspective angle of a line joining the summits, is also altered. Suppose the lines A B, A′ B′ represented, not trees, but the nearer and farther end of a building, of which B B′ was the eave, the perspective angle would, in the one case, be A B D, in the other A B H.

The relative distance from the front is affected in the same way, but in Fig. 3 this is concealed in consequence of the assumption which we made that the bases of both trees were on the level of the eye, *i. e.*, the horizontal line A V′, which was done to simplify the figure. To show this further point, let us suppose the level of the eye to correspond with the middle of the height of each tree, then the effect of the two focal lengths upon the image will be exhibited by Fig. 4, in which the vanishing-points are omitted.

Here it will be seen that the short focus lens not only diminishes the size of the farther tree much more than does the longer, but it brings it nearer laterally to the line of vision, and throws it farther back. On the contrary, the longer focus lens draws the distant tree further forward and further outward, and increases its apparent height: effects that all photographers see constantly taking place within their own experience.

And if we imagine that A B, A′B′ represent, not trees, but the nearer, and farther end of a building seen obliquely, then the lines A B C D will represent the side of that building as it will be reproduced by the shorter focus lens; A G H B as by the longer, producing the same comparative effect as shown in Fig. 3 of the first part. If the lines A C, B D (Fig. 4) were ex-



tended, they would give the vanishing-point, and so with A G, B H.

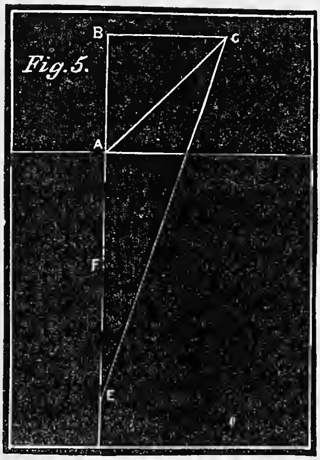
An objection may be made by some readers that the height of the trees, A B, A′ B′, is not represented upon the same scale in the figure, as the focal lengths. To explain this, it becomes necessary to say a word on *apparent magnitudes.*

Suppose we are working with a lens of 6-inch focal length, and that the tree is 75 feet from the lens. This ratio of $75 : \frac{1}{2}$, or 150 : 1 represents the scale on which the tree will be depicted on the ground glass. If the tree be 50 feet high, then its height in the picture will be $\frac{50}{150}$ feet, or 4 inches. Now, if, in fig. 3, A F represent the focal length of the lens, to wit, 6 inches, A B may be taken as representing the correct height of the tree, or $\frac{2}{3}$ as much.

The same reasoning will enable us to determine in every case what size an object of a given height and distance will have on the

ground glass with any lens. It must be rigorously borne in mind, however, that the tree or object is here supposed to be exactly on the central line F′ M. If it is not, we must take as the basis of our scale, not the other oblique distance, measured from the eye to the tree, but that from the eye to a point on the central line opposite.

Suppose we place a lens of 12-inch focus



at E, and have at A a tree 200 feet off and 50 feet high, this tree will be depicted on the ground glass $\frac{50}{200}$ of one foot or 3 inches high—that is its height divided by its distance A E. Suppose another tree of equal height at C, the line A C making an angle of 45° with A B, what will be its height?

Here we must not divide its height by its distance E C, *unless we intend to turn the camera round so as to bring it to the centre of the picture.* If the camera remains pointed in the direction E A, we must consider E B as the effective distance of the object. If we suppose A B to be half of A E, or 100 feet, then the size of the farther tree upon the ground glass will be $\frac{50}{300}$ feet, or 2 inches. In this case, the relative height of the two trees is as 3 to 2. It may not be uninteresting to observe how this proportion will stand, supposing that we substitute a lens of half the focal length of the former, and bring up the size of the image of the nearer tree to 3 inches, by moving the lens to F, one half the distance from it.

The nearer tree is now but 100 feet off, but our unit being reduced from 1 to $\frac{1}{2}$, the scale will therefore be $\frac{1}{200}$, the height of the first tree $\frac{50}{200}$, or 3 inches as before. The second tree is now 200 feet off, its scale will be $\frac{1}{400}$, and its height $\frac{50}{400}$, or $1\frac{1}{2}$ inches. The perspective heights of the two trees therefore as given by the smaller lens, in place of being as 3 to 2 as in the case of the larger focus lens, will be as 2 to 1. These results agree approximately with those given in Fig. 3, although that figure was not drawn for such a purpose: it still, however, illustrates pretty well these measurements.

Briefly, then, we conclude that all lenses (setting aside such imperfections as belong to their construction) will, when placed at the station-point, give pictures varying only in scale. But that when the same scene is taken from two different station-points, everything is changed. If we increased our distance from any given object in the picture, to double or treble, and yet keep that object of the same size in the image, by using a lens of double or treble the focal length, as the case may be, though that one object may remain unchanged, everything else will be. Also, that short focus lenses cannot give correct results, which, in small pictures, are only to be obtained by using lenses of sufficient focus, and retaining the central portion of the picture corresponding to the size required.

PHOTOGRAPHIC VIEWS OF THE INNER MAN.

BY REV. A. A. E. TAYLOR.

There is a field of art as yet unexplored except by a few of the masters, and by them only on exceptional occasions. It were a sufficiently difficult task in painting, to portray in perfect accuracy of detail, all the points of *external* development in a subject, especially when it becomes needful in the self-defence of art to rectify disproportionate points, to correct in the picture that which is faulty in the subject, and yet not to destroy the likeness, or seem to diverge from the strict lines of truthful imitation. Yet all true artists have studiously sought to penetrate beyond this surface likeness, and to fix on the canvas the tokens of the

true internal character of the man they have painted, so far as they dared. So far as they dared, we say, because many of the greatest subjects of the pencil, as well as many of the humbler, would resent and avenge the truthful portrayal of all the artist discerned as he read that inner character which they sought to conceal beneath an innocently arranged face. The fact is, the pictures that men generally want of themselves are not those which truly record their complete characters, but a certain ideal image which they would have others possess concerning them, in which their good qualities should glitter, and their defects be shrouded over. For this reason portraits of ideal or historic subjects, in which the true soul of the supposed or real personage might be fully represented without constraint or fear, have ever been the most attractive as well as the highest specimens of art, of which illustrations will abundantly recur to the student of art.

In seeking, however, to represent the inner likeness of the subject, the artist is in duty bound to give the character the most favorable aspect consistent with truth. The subject demands that much for himself, and the common frailty of humanity disposes us to speak, as well as to think, as favorably and forbearingly of our fellows as we are able. And what speech is so clear and distinct as the portrayal of a face. We must endeavor to draw out the best side of the character of those we represent, on canvas, or on paper.

Now the face of a man is nothing more in itself than the face of a clock, the revealer and interpreter of the internal works. The copy of that face may, whilst true in outline, be no more a correct likeness of the man than the picture of the face of a clock whose works are motionless, would be the correct tale of the time of day. The play of expression upon the countenance, like the movement of the hands of the clock, reveals the true internal workings, the working of the machinery in the one case, the workings of the man's mind and soul in the other. To secure this is to obtain a perfect likeness. Hence ordinary portrait painters are so ceaseless in their exhortations to their subjects to *put on a good expression.* And Richmond, the celebrated English crayon artist, together with several of our more distinguished American artists, owe their celebrity to their combining with the power of accurate delineation, the faculty of drawing forth, by varied and attractive conversation and other similar methods, that expression in the sitting which is not only most characteristic, but most noble and worthy in its characteristics. These artists of the pencil studying the higher characteristics of their subjects, and copying *from memory* the play of their features, noted on other occasions when they were highly interested, or their minds most actively engaged upon favorite topics, possess the liberty of working these into the likeness which they make of them, and so have a past knowledge as well as a present observation for their guidance in perfecting the representations.

The play of expression on the features is as variable and contradictory as the play of internal reflection and emotion from which it springs. That is, therefore, the best and truest likeness of the man which catches and fixes in print or by pencil, those expressions which are called forth by the most characteristic workings of the mind and heart. Men are usually great only upon one or at best upon a few subjects. The play of their features, whilst they dwell upon this or these, is not only that in which their highest nature is best represented, but that in which they are and should be chiefly known by men at large. The affection of a family deems that the best likeness of one of its members, which represents those expressions which the face was accustomed to wear when in the midst of that circle in hours of retirement and repose. The world at large regards that as the best, which possesses those expressions most familiar to that face, whilst engaged in its favorite occupations in busy life, and for the world at large, and not for the taste of the family circle, are pictures ordinarily to be made. But, by noting this fact, portraits may be made to suit either the affection of the family, or the admiration of the outer world as may be desired. The best likeness of the orator, by way of example, for general purposes, is that which represents him in oratorical action,

when swayed by the utterance of his sentiments upon his favorite topics; that of the artist when deeply engaged in his labors upon his works of art, and so on, in all professions and pursuits.

Now, *photography* of persons is hampered by this disadvantage in comparison with portrait painting, that it must be literally truthful to the occasion, and is not able to weave in characteristic expressions which may be revealed and observed on other occasions of action and emotion. Hence these pictures are so often dull and wanting in representation of persons in their best moods. It does not get access to its subjects on the only occasions, when it is possible to do them the highest justice. It finds faces only in repose, and never, as a general rule, when awakened to life and thought by the working of the mind. For it is next to impossible for the subject by any effort to imitate, without evident affectation, that play of thought and movement of feature which produces expression. To be natural, expression must result only from the actual excitement and operation of thought and feeling.

Not until this difficulty is surmounted, will photographic art, so far as it relates to persons, have attained to that perfection which is possible and eminently desirable to it. Not until then, will it be able to give us accurate likenesses of men in those moods of thought and action in which they most truly set forth their characters and personal powers. The question, therefore, arises, how shall photography reach the inner lives, the souls, of men, and place the image of the expression of this higher nature of man upon permanent record.

In a previous article, some months since, in this Journal, upon the general subject of *expression*, the writer made some suggestions pointing feebly to this end. The gist of those suggestions was this, that by placing some new and attractive objects before the subject, to win his attention, and awaken admiration and thought, he should be rendered to a certain extent unconscious of being the subject of the operator's hands; or, by having some engaging person to interest him in conversation upon some novel subject, the same result might be obtained, and a likeness of the person whose mind was awakened might thus be made. It was evident to the writer, then, that these suggestions, made only to turn the attention of practical operators to the subject, were painfully defective. For not the same objects, nor the same topics of conversation would interest all. They would have to be varied to meet the diversified characters, tastes, and education of each subject, which would require great skill and power of judging of human nature in the operator, or in the person required to conduct the conversation. And the emotions thus awakened in the subjects would frequently fail of being truly characteristic of him, which is a great failure. We have, however, seen this plan successful in the case of children, before whose eyes, after their position had been arranged, and all was ready, some interesting novelty, as for example a bird fluttering in a cage, or a new and cunning toy was suddenly unfolded, when the expressions of wonder and admiration and infantile joy were caught in a most pleasing manner in the picture. But such possibilities are rare.

Besides the expression of the face, and closely connected with it, the position has much to do with the accuracy of a likeness. We note this fact here merely because it is necessary to the completion of our view upon this point. It is a subject whose importance is very little regarded by operators in spirit, though always formally as they arrange their subjects, and we intend to advert to it in a future article, devoted entirely to it.

Our attention has been directed to this subject, and we have been led to reflect much upon it, from observing the appearance of members on the floor of the Senate and House of Representatives during their delivery of speeches. When they have paused a moment, after uttering some striking sentiment or eloquent expression, looking towards the chair or their opponents, their whole features alive with passion or emotion, the workings of the mind within writing themselves in characters most distinct upon every lineament of their face, they presented an appearance to catch and fix which would insure fame for any artist. Often have we startled ourselves with the unconscious ex-

pression on our lips, why could not such a face be photographed in an instant, and that nobility of mind in truest manhood, stereotyped in enduring image by this wonderful art. And then as I have turned from the orator to the entranced audience, intently bending forward to catch every word, I have thought that there again were subjects properly prepared for the camera. During the delivery of Mr. Bancroft's late oration in the House, I remarked expressions on the face of General Grant, members of the Cabinet, and of the Senate, lingering there unchanged during the utterance of long sentences, such as no artist could secure at any ordinary sitting. So any one may see persons engaged in social enjoyment in the midst of evening circles, persons interested in reading some fine passage, or in hearing the same read, lawyers at the bar, physicians discussing symptoms, ministers in the pulpit, &c., who presented splendid opportunities for the artist to secure a likeness which everybody would recognize as representing the man in the highest exhibition of his best inward nature. Why cannot such occasions be improved? Why may not arrangements be made, by way of experiment at least, to test the practical utility of this proposed method? Why may not the artist be photographed, whilst busily at work on his picture, pausing a moment in the very midst of things for the purpose? And so also at a signal let the orator pause a second in his oration, and let the literary student become engaged in his reading, and the merchant in the discussion of commercial principles, and let them be taken down as they are, when they are most themselves.

We know there is room for affectation here in the consciousness of the subject that he is to be operated on at the given moment, but we feel confident that with proper celerity and care on the part of the ambitious artist, this might be avoided, and the end truly attained. We are sure the result would be a triumph of the camera over the pencil, and the art would be elevated from the cold formations of a literal copy of the features, to the higher plane and nobler destiny of the vivid and living representation of those inner emotions and evolutions of thought which give a man his character. Then we could measure a man's powers, and read his soul as we gazed upon his picture, and not merely behold as we now so often do, a face barren of all meaning expression, or contracted with pain because of the oppression of unaccustomed light upon the eye; or smirking under the effort to look its prettiest, with no emotions awakened within to create expression; or that rigidity of set features which so much resembles death in life. Is not the end to be reached worthy of a vigorous experiment in a long fair trial? Now, if these crude notions from a lover of art who tries to observe and study how the powers of art may be enlarged, shall only avail to direct attention to this subject, the aim of the writer will have been attained. We are conscious that to the practical operator the method proposed for the securing of the end may seem unnatural and impossible, and he very likely may be able at once to suggest different and better methods. But we have written down these reflections as they have occurred to us after considerable thought, hoping that they might direct some to the effort after the nobler aim of photography as it operates upon the living subject, the effort to represent the true inner man in its best exhibitions and developments upon the countenance. Otherwise you reach only the physical which is perishing, and lose all traces of the spiritual which is imperishable, originally created after the image of God, and bearing upon it the marks of the Divine likeness.

GEORGETOWN, D. C.

LECTURE ON PHOTOGRAPHY.*

BY COLEMAN SELLERS.

Second Lecture.

Delivered January 19, 1866.

LADIES AND GENTLEMEN: At my last lecture I told you that the name photography meant drawing or writing by light, and that this name is a misnomer. That so far as light is the agent which produces vision, it has nothing to do with making the pho-

* Phonographically reported by C. R. Morgan, M.D.

tographic image; that the impression upon the sensitized plate is due to what has been termed actinism, which is distinct from light, existing with some kinds of light, and obeying all the laws that govern light in its movements. I also briefly explained the connection of light and actinism according to the modern undulatory theory.

I should have referred you to a book just published by Professors Morton and Leeds, in which there is a very concise and an exceedingly clear, popular account of this very subject, illustrated in such a way as to make it quite attractive. I know of no book to refer you to, where you could so readily find the information needed as in this one, and I advise you all to read it. I have derived a good deal of pleasure and instruction from it myself.

Last evening I explained to you also the use of lenses and the camera. This evening we enter upon what is really a much more interesting part of the subject, the actual production of the photographic image or picture. The first step in making the photographic picture is called making the negative. The negative is the transparent type from which the printed positive is made. Photography made very little progress until the time when a type could be produced from which a great many positives could be obtained, or a great many copies from the original type. In the Daguerreotype process, as well as in the Ambrotype, one single picture is made at one time. You may have a number of tubes, and take a number of pictures therewith. This is the distinctive difference between making photographs on paper and the old Daguerreotype or Ambrotype process, and makes the former much more valuable.

To show you what a negative really is, Prof. Morton will exhibit upon the screen with the magic lantern a negative and positive placed side by side. You observe on the negative that wherever a high light should be represented, or something white, there is a deep shadow. Above the eyes under the eyebrows there should be a deep shadow which you see in the positive; in the negative it is represented by something light. You observe the name of Washington here in light letters; there in dark letters. The positive looks as if it were a black picture on a white sheet of paper, whereas in the negative it is a white coat on a dark ground, the very opposite from what is required. This negative is made in the camera by the action of actinism flowing upon the plate, and impressing the sensitive film in different degrees. The film is impressed the most where the most actinism comes. The face being the whitest part, is the part which is darkened the most.

In printing the positive, the light is allowed to pass through the glass, and it will pass throughthe more transparent parts of it much more readily than through the darker parts. If upon this plate we place a sensitized piece of paper to be printed, the light on passing through will turn the paper most where the most light can go. The negative is exactly in a condition to produce such a picture as this in the best manner. Prof. Morton will now show you the ordinary portrait negative. You see it has an entirely black face, light beard, light coat, dark in the shirt bosom where it should be white; everything is the reverse of what it should be. We will now put in a landscape negative to make you familiar with the appearance of the negative before we begin making one. It is a negative of one of the boating club houses. You see the shadows are represented by the lighter parts. Where the sun is shining, it is the darkest; everything is reversed, but it is in the best condition to produce the positive from such a transparent negative.

I explained to you how the visible and the actinic image were produced on the same plane in the camera in my last lecture. We make use of the visible image to adjust the focus of the instrument. Then in place of the ground glass on which the visible image is cast, we introduce in the plate-holder a plate of glass which has a film sensitive to actinism. Upon it the actinic rays fall and make an impression.

Now this brings us to the chemistry of the subject. There are in nature very many organic and inorganic compounds that are sensitive to actinism. The vegetable kingdom is wonderfully sensitive to it. If you take a common plant, and shut the light and actin-

ism away from it, the vegetable shoots are no longer green; they are white. If you re-admit the actinism to it, the green will soon return. Everything beautiful in nature, the color of the flowers, the green of the trees and grass, everything is due to actinism, *not to light;* it is light which enables us to *see* them; but *it*, the color, is due to the actinic effect which we make use of in photography.

Photography has made use of very many of these compounds, and almost every new number of the journals brings out some new substance which is sensitive to actinism, and it is descanted upon there. But those to which it owes its present condition are the compounds of silver with iodine, bromine, and chlorine. Now these compounds are produced by what is called double decomposition. The silver which is used by the photographers is not in half-dollars and quarters, but is none the less valuable for that. It is a crystallized nitrate of silver made by dissolving silver in nitric acid. If perfectly pure silver be placed in nitric acid, and the nitric acid be moderately heated, the silver will disappear. But it does *not* dissolve in the sense that *sugar* is dissolved by pouring water on it; for, if you take that solution, and evaporate the water, you get back the sugar, but you will not get back the half-dollar you have dissolved in nitric acid. This substance is a new compound altogether. Now nitrate of silver is not at all acted upon by light; we might put it in the brightest sunshine, it would not be affected at all. Here is nitrate of silver also in solution dissolved in water; it is a clear limpid fluid like the water itself: in each of these little jars there is such a solution, each containing nitrate of silver dissolved in water. We could tell how much by the use of this little instrument. I allude to it now as I shall have occasion to speak of it afterwards. It is what is called an *argentometer*. Those which ascertain the specific gravity of other fluids are called hydrometers. This is arranged to tell the quantity of silver in any solution. It will sink to a greater or less degree in a nitrate of silver solution in proportion to the amount of silver in it, and upon a paper inside is graduated the grains of nitrate of silver to the ounce of water. These vessels, as I said just now, contain nitrate of silver, and we could by this argentometer tell the quantity in them. The iodine, bromine, and chlorine exist in the form of salts of other metals; for instance, if it is iodide of ammonium, it is iodine combined with ammonium; it may be combined with cadmium, potassium, and various other metals. Photographers use many of them; the majority use the iodide of ammonium, and some use the iodide and bromide of potassium, but the majority use the two I have here, and if I have time after a while, I shall tell you the reason why they should be used almost exclusively. Pure iodide of ammonium is not a dark salt, but is perfectly white. But it will not remain white, as free iodine is liberated, and it becomes discolored, but in reality the white iodide is not so well suited for photographers, for if we used that we should have to put in free iodide. Bromide of ammonium is quite a white salt. Now, I have in this vessel some of the chlorine which I intend to combine with the silver: the chlorine is the common table salt—the chloride of sodium. There are also chlorides of ammonium, strontium, &c., any one of which will produce the chloride of silver; the same as any one of the iodides will produce the iodide of silver, or the bromides the bromide of silver. You observe in this case the salt water is perfectly clear; it has been nicely filtered, and salt, you know, is soluble in water; nitrate of silver is also soluble, and if I should pour this solution of chloride of sodium into the nitrate of silver, a new compound would be formed by what has been termed double decomposition. When they are poured together, then the nitric acid unites with the sodium, and forms a nitrate of *soda*, which is also soluble in water. But the chloride of sodium unites with the silver, and forms a chloride of silver, and a precipitation takes place; you observe a cloudy precipitate sinking to the bottom; it is the chloride of silver. It is what is used in some of the photographic processes; you see it quite fills the vessel. Into the next one I intend to pour some iodide of ammonium. I have it here dissolved. I shall add a little water to increase the bulk. Double decomposition takes place, there also the iodine has united with the silver, and

formed iodide of silver. The action of the bromine will be the same. There we have the bromide of silver, the same decomposition taking place in each case, all looking white to the eye. This, the chloride of silver, is white in the daylight, but that, the iodide of silver, is quite a bright yellow. If you should allow the chloride of silver to subside, decant the fluid, collect some of the chloride, place it on glass, and expose it to sunlight it would blacken. It is one of the compounds which blackens when exposed to actinism, and if we should take some of the iodide, and expose it similarly, it would scarcely blacken at all; so with the bromide. But if we were to take some of the iodide, expose it momentarily to actinism, take it into a dark place, and flow over it some other chemical, we would find there had been a latent effect produced, some change taking place in the particles of iodide of silver, and upon the application of that other substance termed the developer, a very violent action would take place, and it would blacken rapidly; not so with the chloride of silver, for if the exposure were momentary, and the developer were applied to it, there would be no action at all. Therefore, in general terms, those salts of silver which blacken the most by the exposure to the actinic rays are the ones least adapted to use for the negative process, or the production of the latent image which shall be developed by the application of some other chemical. For such application the best are the ones which are the least affected in this manner. To make a picture, it would not be very easy to smear these powders over the plate. We should have to fix the powder with something which shall be like a varnish, which would be a clumsy way, therefore it would be much better to coat the plate with some substance which has the iodide of ammonium, for instance, dissolved in it, and then after it had become moderately set, to immerse it into a nitrate of silver bath; double decomposition would take place in the film, and it would be completely saturated with iodide of silver, and would then be in the best possible condition to receive the actinism, and produce this latent image. This is done by what is called *collodion*, which is made by dissolving gun-cotton in alcohol and ether. The gun-cotton used by photographers is different from that used for ammunition; when first discovered, it was used only for the latter purpose. Gun-cotton, however, for shooting, and that for photographic purposes is made differently; that for photographic purposes is prepared by immersing the cotton, carefully prepared, in nitric and sulphuric acids mixed. They must be of certain strength, and the temperature from 145° to 160°, and kept uniform, and the acid should not be of its full strength; if you weaken it a little bit, it will act more violently, and weaken the cotton. But strong acids add another element to it. Cotton made for shooting purposes is made by treating it in the same manner without weakening the acid, because they want to add more of the peculiar effect of the nitric acid to the cotton. I will ignite a small portion of it, and you will see it is not explosive; it burns with a flash; this cotton is soluble in alcohol and ether mixed. To prepare collodion is one of the nice points in photography; every part is exceedingly simple, however. I have weighed out the necessary materials for making collodion as used for photographic purposes. There should be to every ounce of the collodion five grains of iodide of ammonium, two grains of bromide of ammonium. Now, iodide of silver is the substance which forms the greater part of the picture; the bromide of silver seems to be sensitive to the very feeble rays of light; more so than the iodide of silver. The two combined are more sensitive than either one by itself. In making collodion, select those things which are soluble in alcohol and ether. But the bromide of ammonium is not soluble in absolute alcohol. It is soluble in alcohol with some water in it. I shall prepare eight ounces of collodion. To do so, I put sixteen grains of bromide of ammonium in this glass vessel, and add barely enough water to dissolve it; a very small quantity is sufficient. Then I add five times eight, or forty grains of iodide of ammonium; this gives two grains of bromide of ammonium and five grains of iodide of ammonium to each ounce. Then we pour into the mixture four ounces of alcohol. In a clean vial we will put forty grains of gun-cotton. You

never can tell exactly how much gun-cotton should be put in, but generally from forty to forty-eight grains. The gun-cotton differs; of some qualities less is required, of others more; when too much is put in, the collodion becomes too thick and viscid, and will not flow over the plate properly. Into this vial we will pour this sensitized alcohol. You see there is no change in the cotton, it remains the same, does not dissolve at all. We will now add the four ounces of sulphuric ether, and note the effect. Shake for a few moments, and you will find the whole of the cotton will dissolve. You see it is almost gone already; it is rapidly disappearing. In this light it seems quite white, but in reality it is of an amber color. When first mixed, it is yellow. This may be allowed to stand and settle; there will be some sediment. The liquor can then be decanted from it, and it can be used; or, if it is wanted to use in a hurry, it can be filtered in a collodion filter, in the upper part of which there is cotton saturated in alcohol. The collodion poured into the upper part finds its way down. Usually there is a small tube to allow the air to pass up, but that is not necessary. It is filtered much better without the tube than with it. We will pour some of this collodion into this collodion-filter, and allow it to find its way through. Now, you see how simple the making of the collodion is, and really the most important part of the operation is the making of the sensitive substance which is used in preparing the plates. As I said, having coated the plate with some sensitive substance, we then immerse it in a solution of nitrate of silver. It is put in this apparatus, called the bath.

I will observe that photographers abbreviate the names of the chemical substances they use. They never call it the nitrate of silver; they call it the silver, &c. &c. This is the vessel which is intended to hold the nitrate of silver solution; it is made of vulcanized rubber; glass is better, when it can be had of the proper form. This one is made of vulcanized rubber, and can be readily covered to make it better for transportation; for this purpose it answers admirably. But it is not advisable to put the solution into it before the surface has been protected. Before using this one I poured into it a quantity of shell-lac varnish, rolled it about, and turned it out, and then placed the bath-holder in front of a heater. In this way the coating of shell-lac was hardened. Into this vessel we must put the nitrate of silver which is to form the bath, which is made in this way. To every ounce of water (after first determining how many it will contain), add forty-five grains of nitrate of silver. You may wonder why forty-two or forty-eight would not do as well? I think either would do, but forty-five grains to the ounce is an ounce and a half of silver to a pint of water, and it is easy to remember; to every pint put an ounce and a half of silver, and you will have the proper strength. You may keep using it till there is only thirty grains. Still it will work very well. In some other processes I shall say sixty grains. I think this is because two ounces to the pint of water are sixty grains, in all probability a matter of convenience for recollection, and I want you all to remember that there are forty-five grains of the nitrate of silver to the ounce of water in this solution. It is just like dissolving sugar in water; anybody can do it. But there is something else required, if this nitrate of silver is dissolved in water; you must add to it also a little iodide of ammonium, and for this reason: iodide of ammonium is not soluble in water, but is soluble to a certain extent in a solution of nitrate of silver; supposing we had a plate coated with collodion, and intending to use it, we put it into a bath; double decomposition takes place, a film covers it, of iodide of silver, a part of which, sometimes more and sometimes less, dissolves out, and the plate would be weakened in spots, and produce pinholes; the second plate would be better; the third would be better still, till the bath has become saturated. To make it work well at first, it is desirable to saturate it. To do so, you take any quantity of iodide of ammonium, and dissolve it, and drop one or two drops carefully into the solution of nitrate of silver, and shake it violently. A precipitate will take place, similar to what is formed in that jar, only less. If you find some of it in existence, then it is saturated; if it all disappears, you add a little more, and always al-

low an excess of iodide of silver to be in it. Then pour it through a filter, and filter it. In regard to filtering, it is usually done with filtering paper, little circles of paper which are folded in such a way as to allow it to run down in grooves; it is folded as you fold up your fan. Opening it, it forms a funnel that allows the fluid to percolate through the crevices in the paper, and the liquid in that way becomes clear; but in photography they do not use this paper always; they sometimes use ordinary cotton. Now cotton in its natural state repels the water. The water runs off as it would run from a duck's back; but if to the cotton is added the smallest quantity of alcohol, the water unites with it immediately. Take a pellet of such cotton, and throw it violently into the funnel. You have a filter ready made, through which the silver becomes quite clear. The cotton can then be taken out, thrown one side till considerable is collected, when we can regain the silver from it. I mention these little things because they are of great importance, and to understand the details of the art, and be successful, it depends upon the attention to these little things, and doing them in the best possible manner. Into this bath I will pour this solution of nitrate of silver. If it was pure nitrate of silver saturated with iodide of ammonium, it would be in the best condition for making pictures; it has to be used carefully under such circumstances. The beginner should add to the bath a very little acid; glacial acetic acid is used for that purpose. One single drop would be sufficient for a bath of this size. The bath is not quite so sensitive with the acid in it, but it works clearer and makes nicer, cleaner pictures. We now come to the glass to be used. In selecting the glass for photographic purposes, it should be transparent, and as little colored as possible. Examine it and see that there is not much curvature. The best glass would be the highly polished plate glass, but that is too expensive. The next best is the French crystal. Before the glass is cleaned, it should have the edges smoothed; this can be done by a file or rubbing one piece of glass on another. All foreign substances should be removed. To do this in the best manner, place it in a bath of nitric acid, one pint; water, one pint; and a quarter of an ounce of quicksilver, and this makes an acid nitrate of mercury. It does not hurt your hands; it acts upon the films and varnish in a powerful manner, and cleans it off readily. We then wipe the glasses with a clean cloth, and wash them under the tap, and after that wipe quite dry. If you want to, you can use some rouge, such as they polish silver with, by putting some in alcohol, and rubbing it over the plate, and polishing the plate carefully. Never use any alkali in cleaning the glass, because it eats away and destroys it. After the glass is clean, the next important step is coating it with collodion. I have here a plate of glass which has been prepared in this way. I brush off the dust. Then I intend to pour upon it some collodion prepared in the same manner as this, only a little bit *older*. The older it is, the darker colored it becomes. As it gets older, it becomes a deeper and a deeper *red*, till it becomes as dark as wine. This must be poured on the plate to form an even film upon its surface.

(To be continued.)

THE LEGGOTYPE.

THERE seems to be no end to the number of photographic printing processes that are possible, and we hope there will not be any end to them, for we know that photography is but an infant yet, and we dare not predict its future doings.

We have received from the inventors, Messrs. G. E. Desbarats & W. A. Leggo, of Quebec, C. E., some specimens of what they term "Leggotypes," or "Photo-electrotypes"—done upon a common hand printing-press—by their patented process. The object of the patentees is to produce electrotype plates of pictures, ready for common printing, like ordinary type printing, without engraving or other hand work. The process is briefly as follows: Upon the varnished side of an ordinary negative, pour a solution of gelatine containing bichromate of potash. Dry, and expose the uncoated surface uppermost to light, which fixes that portion of the bichromate upon which the rays fall. Dissolve off the unfixed portion

by dipping in warm water; drain, and we have a film upon the glass more or less raised, according to the strength of the lights in the picture. Take an impression of this film in plaster. Dip the impressed plaster in hot wax, and place the waxed surface upon a glass plate also covered with hot wax. The wax upon the plate unites with the wax upon the plaster, and the latter may then be removed, leaving upon the plate a fac simile in wax of the original photographic gelatine film. The fac simile being now dusted with plumbago, and electrotyped in the usual manner, a printing block in copper is produced, capable of use with printer's ink upon any press.

The specimens received by us are copies from woodcuts, steel and copperplate engravings, and from photographs from life. Some of them are very faithful reproductions, and speak highly for the process, though in others we notice great room for improvement. Like most other copies, the better the original, the better will the copies be, and of course, in this case the best reproductions are from those copied from line engravings on steel. One of them, the head of a brigand, is very faithful, though in fact not much superior to a head of our Saviour from a copper plate engraving.

In a letter from Mr. Desbarats, he says, "We are working to attain perfection, and not till then will we place the thing fully before the public. I, however, send you some proofs, and will send you some much superior, soon."

We shall endeavor to make arrangements to give our readers a specimen, and fuller details of this process in future.

Waterproof Enamel for Card Photographs.

San Francisco, March 9, 1866.

Editor Philadelphia Photographer.

The following process for enamelling cards is a very good substitute for the collodion transfer process, and is much easier of application.

First apply to the surface of the card with a brush, a solution of gum arabic in water, of sufficient strength to give considerable gloss when dry. As soon as dry, apply a coating of plain collodion in the same manner as coating a plate. If the collodion is not very tough, two or three coatings may be applied to advantage. Finish by passing the card through a roller, and you will have a fine gloss. Care must be taken not to have the gum solution too thick, or the surface will crack when dry, though there is but little danger, if the collodion is applied soon after the gum is dry. Gelatine, instead of gum arabic, answers the purpose well, though it gives hardly as much gloss. Perhaps you or your readers may have a better process than this. If so, let us have it. I inclose a few samples enamelled as above.

M. S.

The samples sent with the above are certainly very pretty looking, and the enamel stands the test of water, and does not appear to crackle by bending. The enamel is quite equal to any we have seen anywhere in all the essential points. Ed.

SENSITIVENESS OF PURE IODIDE OF SILVER.

BY M. CAREY LEA.

It having been suggested that in my proof as to the sensitiveness of pure iodide of silver, there was one possible source of doubt, viz., that the river water might, by reason of organic matter therein contained, act as a sensitizer, I have so repeated the experiment as to avoid this doubt. A film of metallic silver, attached to glass, was iodized with alcoholic solution of iodine; then the excess of iodine removed with alcohol by washing. Thus the plate, after being iodized, and even during that operation, was never for a moment in contact with water. The same experiment was made with iodide of silver on very pure paper, which was in like manner washed with alcohol only. In both cases the iodide proved sensitive to light, and an image was easily developed on it.

In the case of the film on glass, the plate was left in the sun and diffuse light for several days, and (as in a previous experiment), spontaneously recovered its sensibility by remaining forty-eight hours in the dark.

In a late number of the *Notes*, Mr. Sutton publishes an article in which, in not very

courteous language, he impugns the theory above-mentioned.

He seeks to invalidate the proofs which I have heaped up upon this subject, by misstating some and passing over the rest. On the other hand, he has nothing to bring forward to support his view of the question, but a single mode of preparing iodide of silver, which, so prepared, is, he says, insensitive to light. To this experiment he has referred to for a very long time as the mainstay, and, indeed, the only stay, of his opinion. Having had this experiment more than once objected to me by Mr. Sutton, and not in the least believing in it, I resolved to repeat it carefully. It is as follows:

Yellow iodide of silver is to be prepared and dissolved in a saturated solution of iodide of potassium. Paper is to be soaked in this solution, and then dried. Then this paper, thrown into water, turns yellow, because the water dilutes the iodide of potassium, and the latter, thus diluted, lets fall the iodide of silver in the paper. Of this paper Mr. Sutton affirms that it is totally insensitive to light, and cannot be rendered so by any amount of washing; and that no exposure, however prolonged, will produce any impression that can be developed.

I carefully repeated this experiment, using pure materials, careful manipulation, perfectly pure paper (Swedish filtering paper, manufactured for chemical analysis), and rigid exclusion of light. The paper thus made *proved very sensitive to light.* Twenty-five seconds exposure to diffuse light on a dull day, under a thick negative, was abundant for it. With three minutes dull light, the picture was completely solarized on the face, but distinct on the back of the paper. *Six* developments were made, all of which succeeded: there was no failure in any case.

I commenced the experiment with a feeling of perfect certainty as to the result. Mr. Sutton's failure to perceive the sensitiveness can only have arisen from imperfect manipulation, or bad material.

There is now on record no single experiment in favor of the old theory, which evidently depended upon a misconception of facts. Pure iodide solarizes easily, but easily recovers its sensitiveness in the dark: and doubtless, also, when a sensitizer is applied. This is evidently the true condition of a matter which has been so long misunderstood.

Since the above was written, the editor of the British Journal reports that he has carefully repeated Mr. Sutton's experiment with paper forwarded to him by Mr. Sutton, and with the same result above described: he found it sensitive to light after washing. The editor gives his unqualified adhesion to my views on this subject.

P. S. Mr. Sutton, in his "Notes" for April 1, received since the above was in type, gives up the point, and frankly admits the correctness of the view for which I have until very lately stood alone in contending.

BROMIDE AGAIN!!

Our correspondents do not yet feel inclined to let us off on this vexatious question, and like horse-leeches, cry out for "more." We shall be exhausted, we fear, before very long. Some of the skeptical seem to think we have acted like Ananias, and "kept back" part of what rightfully belongs to them, in the way of evidence against the patent, and ask, "How about the use of bromide in collodion by Dr. Cresson, in 1852?"

Upon referring to the Journal of the Franklin Institute, page 422, in the report of the proceedings of the meeting of the Institute, held May 20th, 1852, we find the following:

"Dr. Rand exhibited some further specimens of the Hyalotype, taken by the collodion process, by Dr. C. M. Cresson, to which he called the attention of the members at the last meeting. By the addition of *bromine*, the sensibility of the film had been much increased."

We further learn that these hyalotypes "were taken in from six to thirty-two seconds in different lights, and in one-fourth and one-half seconds in the open air. They were photographs on glass, taken by the collodion process, published in the Glasgow Practical Mechanic's Journal, in December, 1851, which process was, viz.:

"To pure sulphuric ether add one-eighth of its bulk of alcohol; then a little iodide of potassium, and after this, the prepared cot-

ton. Let these be well shaken together, and then allowed to settle. Four or five grains of iodide to the ounce of this will be found sufficient."

It was the addition of *bromine* to this collodion that Dr. Cresson suggested, which certainly does not mean bromide of potassium, or its equivalent; hence we cannot see that it gives us any hold against the Cutting fraternity. However, some wise judicial may differ from us, and we offer it for what it is worth.

Now, to those who still desire to contest this patent, we would say that their only hope is to prove that it was incorrectly issued.

A remedy is provided for such cases by the patent law, as we announced in our last; and as they may be useful to our readers in treating with other patents, we give space to sections 14 and 15 of the act approved July 4th, 1836, and the 9th section of the act approved March 3d, 1837:

"SEC. 14. *And be it further enacted,* That whenever, in any action for damages [for] making, using, or selling the thing whereof the exclusive right is secured by any patent heretofore granted, or by any patent which may hereafter be granted, a verdict shall be rendered for the plaintiff in such action, it shall be in the power of the court to render judgment of any sum above the amount found by such verdict as the actual damages sustained by the plaintiff, not exceeding three times the amount thereof, according to the circumstances of the case, with costs; and such damages may be recovered by action on the case, in any court of competent jurisdiction, to be brought in the name or names of the person or persons interested, whether as patentee, assignee, or as grantees of the exclusive right within and throughout a specified part of the United States.

"SEC. 15. *And be it further enacted,* That the defendant in any such action shall be permitted to plead the general issue, and to give this act and any special matter in evidence, of which notice in writing may have been given to the plaintiff or his attorney, thirty days before trial, tending to prove that the description and specification filed by the plaintiff does not contain the whole truth relative to his invention or discovery, or that it contains more than is necessary to produce the described effect; which concealment or addition shall fully appear to have been made for the purpose of deceiving the public, or that the *patentee was not the original and first inventor* or discoverer of the thing patented, or of a substantial and material part thereof claimed as new, or that it has been described in some public work anterior to the supposed discovery thereof by the patentee, or had been in public use or on sale with the consent and allowance of the patentee before his application for a patent, or that he had surreptitiously or unjustly obtained the patent for that which was in fact invented or discovered by another, who was using reasonable diligence in adapting and perfecting the same; or that the patentee, if an alien at the time the patent was granted, had failed and neglected, for the space of eighteen months from the date of the patent, to put and continue on sale to the public, on reasonable terms, the invention or discovery for which the patent issued; and whenever the defendant relies in his defence on the fact of a previous invention, knowledge, or use of the thing patented, he shall state, in his notice of special matters, the names and places of residence of those whom he intends to prove to have possessed a prior knowledge of the thing, and where the same had been used; in either of which cases judgment shall be rendered for the defendant with costs: *Provided, however,* That whenever it shall satisfactorily appear that the patentee, at the time of making his application for the patent, believing himself to be the first inventor or discoverer of the thing patented, the same shall not be held to be void on account of the invention or discovery, or any part thereof, having been before known or used in any foreign country; it not appearing that the same or any substantial part thereof had before been patented or described in any printed publication: *And provided, also,* That whenever the plaintiff shall fail to sustain his action on the ground that in his specification or claim is embraced more than that of which he was the first inventor, if it shall appear that the defendant had used or violated any part of the invention justly and truly specified and claimed as new, it shall be in the power of the court

to adjudge and award, as to costs, as may appear to be just and equitable."

"SEC. 9. *And be it further enacted* (anything in the fifteenth section of the act to which this is additional to the contrary notwithstanding), That whenever, by mistake, accident, or inadvertence, and without any wilful default or intent to defraud or mislead the public, any patentee shall have, in his specification, claimed to be the original and first inventor or discoverer of any material or substantial part of the thing patented, of which he was not the first and original inventor, and shall have no legal or just right to claim the same, in every such case the patent shall be deemed good and valid for so much of the invention or discovery as shall be truly and *bona fide* his own: *Provided*, It shall be a material and substantial part of the thing patented, and be definitely distinguishable from the other parts so claimed without right as aforesaid. And every such patentee, his executors, administrators, and assigns, whether of a whole or of a sectional interest therein, shall be entitled to maintain a suit at law or in equity on such patent for any infringement of such part of the invention or discovery as shall be *bona fide* his own as aforesaid, notwithstanding the specification may embrace more than he shall have any legal right to claim. But in every such case in which a judgment or verdict shall be rendered for the plaintiff, he shall not be entitled to recover costs against the defendant, unless he shall have entered at the Patent Office, prior to the commencement of the suit, a disclaimer of all that part of the thing patented which was so claimed without right: *Provided, however*, That no person bringing any such suit shall be entitled to the benefits of the provisions contained in this section who shall have unreasonably neglected or delayed to enter at the Patent Offiee a disclaimer as aforesaid."

Now we are ready to cover the whole thing; and if there is anything else our readers desire to know respecting this matter, we shall be glad to oblige them. Looking at it economically, we think submission to the patent is the wisest and best way.

COLLODION WITHOUT BROMIDES.

The following process for making collodion without bromides will be found very excellent.

Ether, ...	1 oz.
Alcohol, ...	1 "
Cotton, ...	6 grs.
Iodide ammonia, . .	3 " or lithium, 3.
" cadmium. . .	3 " or potassium, 3.
Muriate of ammonia, .	2 "
Saturated solution of muriate of ammonia, .	2 to 4 drops.
Tincture of iodine, .	1 or 2 "

Add all the iodides directly to the plain collodion, except the iodide of potassium, which dissolve in as little water as possible. The two grains of muriate of ammonia are added to saturate any water in the ether and alcohol. This will sometimes be sufficient, especially when water has been added to dissolve the iodide of potassium. When no water has been added to dissolve the iodide, 1 to 4 drops of the saturated solution of the salt is generally required. By following this formula, the largest amount of salt may be added with the least quantity of water, and sensitiveness and detail can be secured equal to any bromide collodion, and giving more dense and softer negatives.

F. B. CLENCH,
Lockport, Niagara Co., N. Y.

THE "OPALOTYPE ON IRON."

EDITOR PHILADELPHIA PHOTOGRAPHER.

DEAR SIR: In the February number of your Journal, you published an article on "Opalotypes on Iron," giving your opinion thereon. Having, through the kindness of Mr. Griswold, the inventor of this new style of pictures, had an opportunity of viewing the specimens which were the subject of your article, and being of almost the opposite opinion of yourself concerning their merits, I thought it would be of interest to photographers to have two opinions of this new patent process, before they should spend their time and money on it, and I think that it is the duty of every photographer to oppose the introduction of materials which will have a tendency to work injury instead of benefit. This was the sole motive which

induced me to read a paper on the above subject before the Society at the March meeting. Without the publication of your article, I would not have thought of those pictures of Mr. Griswold again, as they did not need any comment. Having seen those specimens under glass only, and not knowing anything about the material, they were made of, I could only guess at this; but having had some practice in the same direction, it was quite natural for me to suppose them to be produced by a similar process to the one I had experimented with.

Mr. Griswold having sent four specimens and a bottle of the white enamel, for inspection to the Society, I availed myself of the opportunity of a closer examination in regard to the material used. I will first speak of the appearance of these four specimens. Three were exceedingly sharp, the fourth had double outline. Three were of a snuff-color tint, the fourth a little more purplish, all four wanted depth and detail in the shadows, the high lights being of a somewhat muddy tinge, when compared with prints on paper, and all four were covered with a network of cracks, which were more perceptible, where the enamel and varnish were thickest, with a tendency to scale off, when touched. After two days' exposure to light, all four had changed decidedly brown, more or less, and one had turned yellowish brown, even where it had not been exposed to light, but only so far as it had been covered by the varnish. The cracks had become more perceptible, and the tendency to scale off seemed to be stronger. A sorrier set of photographs could not well be seen, and I would have liked that the members of the Society, for whose inspection and criticism they had been sent, could have seen them in that condition.

The bottle with the enamel revealed all these shortcomings and failures.

In the first place, good positives cannot be produced, when the sensitive silver is mixed with the material—that is the substance of the picture: it can only be done on the surface, and the more the picture is on the surface, the finer it will be; this is the reason why these pictures want detail in the shadows.

The turning brown and cracking and scaling off is attributable to the nature of the enamel, and with this material unavoidable.

The principle on which its production is based is the property of some resinous gums, and when dissolved in alcohol with a certain amount of water added, will dry up into a pure white substance, when dried spontaneously.

Take for an example a good sample of plain collodion, and dissolve in it gum sandarac; when dissolved, add a certain quantity of distilled water. This solution or mixture is almost colorless, but by spontaneous evaporation will dry up perfectly white, and according to the quantity of water added, in a finer or coarser grain. If some chloride has been dissolved in the water before adding it to the collodion and gum mixture, a picture can be obtained on it. The use of resinous gums in the production of positives I have found impracticable on account of it being almost impossible to destroy the unaffected silver, without injury to the picture. To this is attributable the turning brown of Mr. Griswold's specimen; or will anybody think that Mr. Griswold would have sent specimens to a Photograph Society without having exhausted all his means to render them as perfect as possible? The introduction of water into the collodion and gum mixture destroys the tenacity of both, therefore the white enamel is very tender, and requires a varnish to strengthen it as well as to give more strength to the sunken in picture, but any varnish put on a material of so little tenacity will, by its contractive power, make it crack and scale off.

Besides the above-mentioned properties, this enamel possesses some peculiarities of its own, which I do not think will elevate it much in the estimation of photographers. It will not stand much heat, as a little of it will dissolve away the picture, not leaving a trace of it.

The same pleasing effect is produced, if ever the picture should come in contact with sulphuric ether, alcohol, chloroform, camphene, or in fact almost anything but water, at least anything that will dissolve resinous gums. Therefore, I would suggest to give these pictures the name of Griswold's dissolving pictures.

As to the collodion and gum mixture of Mr. Griswold's own make, I found that after four weeks it would only make a very imperfect film, and was more sticky to the touch, showing that its keeping qualities are not the best.

The preparation I recommended has none of the wonderful properties above related, but there is the difference that I condemn mine, and Mr. Griswold proposes to us to substitute his for materials far superior in every respect.

But I can assure Mr. Griswold that whenever he has succeeded in producing a white enamel without the above-mentioned defects, I will be amongst the first to use it.

Personalities in which Mr. Griswold is so liberal I pass over with a smile. They speak for themselves, and always rebound to those who use them.

Yours, truly,

F. A. Wenderoth.

Philadelphia, April 2, 1866.

WINTER VIEWS OF NIAGARA.

A few days ago a modest-looking parcel came to our sanctum with a note, reading as follows:

"Boston, March 6, 1866.

"As we hear from you every month by your Photo Journal, and supposing you are interested in your subscribers, we send you a few specimens of our stereoscopic work, to let you see how we are progressing in our beautiful art, while we remain, truly, yours,

"J. B. Heywood."

Now, if we could get our readers together in the Academy of Music or some other large place, with the aid of a good stereopticon it would be easier for us to exhibit the grand beauties of the aforesaid parcel than it would be for us to describe them so as to convey any idea of them.

Mightier pens than ours have been despairingly thrown down in the vain effort to describe the wonders of Niagara, and experiencing the same feeling at this moment, we are almost tempted to throw aside ours as we attempt to describe the stereoscopic gems sent us by Mr. Heywood. They are Niagara itself! They must be *seen* to be appreciated, and words can convey no idea of their beauty, neither can the *pen*, but a *mightier* than they has done the work for us, and we know many will be glad to secure these elegant fruits of its handiwork.

The parcel contained about twenty-five pictures. Most of them are Winter Views of Niagara, and are entirely new and different from anything we have ever seen before. Two hours and more were spent looking at them, and the temptation to spend more time with them is irresistible. Let us see what they are.

No. 355 is the "Rapids and Wetmer's Mill." Here the angry waters seem to be having a fierce struggle with the Ice King. Though successful in congealing and piling up great banks of the water, and in stopping the works of the mill apparently, this arbitrary monarch finds the rapids too strong for him to conquer entirely.

No. 354, The rapids and top of Horseshoe Falls is a similar picture to the other.

No. 353, Terrapin Tower and Bridge.

No. 358, Rapids and Goat Island.

No. 363, Ice Scene on the Canada Side.

No. 385, American Falls and Ice Bridge.

Nos. 390 a, 392 c, 394 e, Studies at Horseshoe Falls, and No. 373, Niagara Falls, give us familiar views of these great world-wonders clothed in their winter draperies.

Nos. 385 and 390 a, are very curious, indeed, showing the wondrous formations of ice and frozen spray.

In the latter the effect is truly wondrous. The ice seems to be almost real and transparent, and in its curious shapes stands out almost nature-like. After these we have some few whose beauties make them seem almost too real to be pictures.

No. 346, American Falls through an arch, is a grand view. One of those tall trees near the Falls, having been covered with accumulated spray, was bended over by the icy load until it formed an arch. With true artistic taste our artist has given us a view of the Falls through this arch. It is surprisingly beautiful.

No. 364, American Falls from the Canada side, exhibits great masses of gigantic icicles, hanging down from the adjacent rocks to the water.

No. 371, Icy Grove, and No. 376, Icy

Scene at Point View, seem to bring before us a winter scene in Fairy Land. The beautiful effects of trees incrusted with ice and snow are here represented in grander style than we are permitted to see them in our latitude. When they are at all approached, they last but a few hours, but here we have them caught and fixed for our enjoyment at all times. In the former the fairies only are wanting to perfect the delusion. In the latter we have the fairies in a thousand icy shapes.

No. 398, Ice Mound formed by spray, and part of the American Falls, is another wondrous beauty. This ice mound is formed by the freezing of the accumulated spray, and grows every day. It is almost as high as the top of the Falls, and the top of it is visited daily by those who dare venture to climb it. The picture shows a man running down the mound, which seems even more difficult and dangerous than to ascend it.

Accompanying these, we have a series of views of *Cape Ann Scenery*. Though not as grand and fearful, they are quite as beautiful in their way.

Nos. 314 a, 316 c, 315 b, 327 m, 34, and 47 are "Marine Studies," the latter being instantaneous, and quite successful in catching the water in its tumbling contortions. The artist seems to have enlisted Nature in his behalf, and to have induced her to show him some of her happiest effects in cloud, sun, and water. They look more like views of which an artist had caught but a momentary glimpse, and afterwards elaborated with brains and pencil and color, than like actual images of Nature. In the former two, we have the reflection of the sun upon the distant water, seemingly the horizon, and while the rest is dark, vessels are seen sailing across the lighted space, forming a panorama never equalled by any artist's touch. We notice but one defect in the whole. The negatives are too thin to give as good and happy an effect as might otherwise have been easily obtained.

We will not further enlarge upon these beautiful views. We advise all to get them. These wonderful productions of Nature and equally wonderful reproductions of art must be seen to be appreciated.

Mr. Heywood's Views are published by Mr. Frank Rowell, 335 Washington Street, Boston, Mass., who also publishes a catalogue of these beauties.

FRED. WM. VON VOIGTLANDER.

Frederick William von Voigtlander was born at Vienna in 1812, and after finishing his studies at school, he received from his father his first practical instructions in lens making. He prosecuted his higher studies at the Imperial Polytechnic Institution, and afterwards he passed several years in Germany, France, and England, for the purpose of extending the scope of his acquirements.

In 1835 he entered the paternal business on his own account, and, adopting Frauenhofer as his ideal, he tried principally to augment his theoretical knowledge. At this period he occupied himself a good deal with the determination of the refracting and dispersing qualities of flint and crown glass, and constructed apparatus wherewith he could execute any given curvatures up to 0.0005 of an inch, &c., in order to appear before the world with a work of larger dimensions, having previously computed and executed smaller telescopes, which Stampfer, Schumacher, and Gaus preferred in some respects to those of Frauenhofer.

In 1840 he became acquainted with Professor Petzval, and constructed the first combination of lenses for taking photographic portraits, according to the computation of the latter. Voigtlander supplied the indices of refraction and dispersion of the glass used.

From the execution of this first portrait lens, the rise and, in some respects, the existence of the entire photography of the present time, take date; for optics had to surmount the difficulties which the want of sensitiveness of the materials used at that time presented, and the intermediate steps photography had to take up to the very sensitive collodion films of the present time would have been quite impossible. Of what use would have been the triplets, periscopes, globe lenses, &c., at that time, when it was barely possible to take a picture with the quick-working combined lenses? They have become useful only since the chemical part of photography has been raised to its pre-

sent height, just as the steel pen has become popular only since the introduction of machine-wove paper.

Voigtlander never has over-estimated the part he took in the invention of the portrait combination, and it is therefore the more incumbent on us to emphatically call attention to the fact that he undertook to execute those lenses with a degree of practical knowledge, energy, and honesty, commensurate to the importance of the invention, and which established his reputation very rapidly in all parts of the globe.

The extension of photography was so rapid that no one could have foreseen it. Vienna at that time could hardly be suspected of becoming the initial point of an industry destined to hold France and England in comparative vassalage. This doubtful point may have been the reason why Voigtlander and Petzval never entered into a precise compact which would have secured to the photographic world their personal co-operation for the future. On the contrary, seventeen years afterwards Professor Petzval came out with his orthoscopic lens; and Voigtlander having asserted in a memorial to the Academy of Sciences of Vienna, as well as in a pamphlet published on the subject, that Petzval had given him the draft of his orthoscopic lens for execution already at the period when they had worked together, the bitterest enmity ensued, and contentions about patent rights arose which led to legal prosecutions, and even at the present period a final compromise seems almost hopeless.

The portrait combination, therefore, and the orthoscopic lens were almost the only remaining results of the Voigtlander-Petzval co-operation; and it must be conceded that other nations have now taken the lead, since the next important forms of photographic apparatus—the triplet arrangement and the globe combination—have been introduced by Englishmen and Americans. But for *portrait taking* nothing superior has been introduced to the Petzval-Voigtlander combination lenses, those which, with slight modifications in curvature, &c., are now exclusively used for portraiture at the present day. This apparatus has taken a tour round the world, and is just as popular in Africa and Asia as in America and in Europe.

Although it is not long since the Brunswick newspapers described the festivities celebrated by the workmen of Voigtlander's manufactory on the occasion of finishing No. 10,000 of his photographic lenses, at the present time the number of them already exceeds 18,000.

Other leading articles manufactured in Voigtlander's establishment are opera and field glasses, constructed by him first in 1842, in which the objective as well as the eye glasses are of achromatic construction, and which in great numbers are disseminated in all directions, and amongst all classes of society, particularly in England, where a *Voigtlander* is appreciated in the theatre and at the race-course, as well as in the military and naval services. The two establishments at Vienna and Brunswick employ about eighty workmen; and at the latter place the instruments are executed in a regular factory, which, however, does not impede their being finished in a manner adequate to the highest scientific and artistic requirements. A steam-engine facilitates the labor, and two glass furnaces are employed, in which the rough optical glass furnished by England and France is moulded. The business ramifies into all parts of the world Contracts have been entered into by agencies for supplying different countries for several years, and the establishment is represented in all important places on the globe.*

OBITUARY.

It is with much regret that we announce the decease, on the 7th of April, of Mr. W. J. Buck, Secretary of the American Optical Company. No doubt many, besides ourselves, will miss his genial face and agreeable voice, when visiting his former place of business. We remember at our last interview, which was but a few weeks ago, how earnest he seemed to be in his desire to further the interests of our art, and in his decease we have met with a common loss which cannot well be repaired.

* Laid over from our February issue for want of space.

About thirty-six years since Mr. Buck came from Utica to the city of New York, and opened a saddlery hardware store on Pearl Street, and was for many years the leading merchant in his line of business. He was a strong advocate for home manufacture, and was one of the very first engaged in establishing the manufacture of his class of hardware in this country. To his encouragement and perseverance they are largely indebted for their final success.

He retired from active business in 1854, and for some time was only engaged in settling his old business, but after only a few years of rest his natural enterprise and energy of character led him to seek for some active employment, and he embraced the opportunity offered by the late Mr. Harrison. Mr. Buck, as a merchant, possessed great enterprise, untiring energy, and perseverance to the final end, and that rarest of accomplishments the faculty of gaining and keeping the esteem and confidence of all his friends and customers.

He was, from early boyhood, an exemplary member of the Presbyterian church, and has always taken an especial interest and an active part in their Sabbath-schools, and in his latter life the greatest source of his enjoyment was in giving instruction and amusement to the children connected with them.

*At a meeting of the New England Photographic Society, held at Boston, March 12th, 1866, the following resolutions, offered by Mr. Masury, were unanimously adopted:

Whereas, it has pleased the Almighty to remove from our midst, Mr. George M. Silsbee, one of our oldest and most estimable members,

Resolved, That the New England Photographic Society, while sincerely regretting their loss, hereby tender to his afflicted family their deepest sympathy.

Resolved, That a copy of these resolutions be sent to his family. S. Masury,
President.

W. M. Gardner,
Secretary.

* Too late for our last issue.

CORRESPONDENCE.

Philadelphia, April 7th, 1866.

Editor Philadelphia Photographer.

In a note published in the April number of your Journal by Dr. Thomson, I am reproached for condemning his modified developer, without having given it a trial. I must say I was so discouraged with the trial of Mr. Lea's samples, that I did not think it worth my time to try more of a like nature. I am satisfied that people should see things in their own way, and presume I have the right to do the same. But to satisfy myself, I have made some developer by Dr. Thomson's formula, to test it with the acetic acid and iron, the results of which were submitted to the Photographic Society at the last meeting, and by which was proven that notwithstanding Dr. Thomson's modification gave more satisfactory results than the samples prepared by Mr. Lea, they were in no point equal to the acetic acid and iron, and Dr. Thomson, who happened to be present, acknowledged that notwithstanding he had obtained fine results with his developer, for superior work the acetic acid was the best.

Dr. Thomson's allusion to the "wet blanket," in connection with my name, is, I hope, undeserved, as all those who know me know that I am always ready and anxious to take up anything, no matter from whence it comes, which is calculated to advance photography. Respectfully, yours,

F. A. Wenderoth.

We never understood Dr. Thomson to say that his modification produced *better* results than the acetic acid and iron developer, but he did say that it would produce very fine results, and that it would do away with the use of acetic acid, which makes it more economical than the other. This is one great advantage claimed for it, and if those who try it like it, Dr. Thomson is only glad to have done them a service. He has no interest whatever in the matter, only a sincere desire to benefit the fraternity whenever he can. We recently made some of Dr. Thomson's developer, and distributed it among some friends. Some were highly pleased with it, and others condemned it as valueless. So is it with Mr. Lea's developer, and with all other good things. Ed.

PHILADELPHIA, April 12, 1866.

EDITOR PHILADELPHIA PHOTOGRAPHER.

DEAR SIR: Having learned that persons using my new water-color varnish to varnish colored opalotypes produced on collodio-chloride of silver films, have lost their pictures by being dissolved away by the varnish, I would state that a varnish in whose composition sulphuric ether is used is entirely unfit to varnish collodion films with, as every photographer ought to know.

Respectfully, yours,

F. A. WENDEROTH.

PHOTOGRAPHIC SUMMARY.

BY M. CAREY LEA.

GERMANY.

Economical Positive Process.—Schnauss holds that the beauty of photographs depends, not upon the absolute quantity of chloride of silver contained in the paper, but upon the excess of nitrate of silver present. That therefore the salting should be reduced to a minimum, and that this may be done without injury to the brilliancy of the print.

Especially he holds that albumen papers are too strongly salted, and refers to the fact that albumen contains always chlorides to the extent of $1\frac{1}{2}$ per cent. in dry albumen. But in his opinion, it is the albuminate of silver that is the important agent in producing the pictures. He therefore proposes to use un-salted or crude albumen. Such gives, when used with ordinary nitrate of silver, poor and mealy pictures, but with a proper bath gives, he says, excellent results. The bath directed is as follows:

Nitrate of potash, . .	32 grs.
" of magnesia, . .	32 "
" of silver, . . .	9 "
Water, ...	1 oz.

These salts should be pure. The nitrate of magnesia is used to check the disposition which the nitrate of potash exhibits, to crystallize.

A great number of sheets can be sensitized on this bath without re-making.

An advantage claimed for this process is that the prints, after being toned in the gold bath, do not further change in the fixing. They require to be printed strongly, but not more so than usual.

[Photographs executed in this way have been favorably spoken of: it is therefore given here, that those who may be disposed may give it a trial.] *Photo. Archiv.*

Lighting the Sitter.—In the course of some remarks upon this subject, Schnauss observes that one of the commonest faults lies in having a too powerful front illumination, throwing the high lights on the ridge of the nose, the centre of the forehead, the chin, and the elevations of the cheeks. In such a case the eyes have a bright point precisely where the black pupil ought to be, if they are directed forwards, and this especially with light eyes. As sources of hard negatives he specifies:

1. Under exposure and over development.
2. Old baths, especially those acidified with acetic acid.
3. Old reddish collodion with little or no bromide.
4. Use of iodide of ammonium or potassium.
5. Pyrogallic development.
6. Too cold temperature in winter.

Soft negatives depend upon the free use of cadmium, a full proportion of bromide, and avoidance of redevelopment.

Photography on Silk, Linen, &c., by Edelbauer.—White stuffs are to be selected, and the starch in linen, &c., thoroughly removed. Take

The white of one egg,
Distilled water, 5 oz.
Sal ammoniac, 20 grs.

Beat up and let subside. Mark the side of the material to be operated on, and let that side float on the albumen five minutes. Sensitize on a 25 grain bath by floating seven minutes.

The rest of the operation is precisely as in the case of paper printing, in every respect. The printing must be done on the same day as the sensitizing, else the material turns yellow.

Silk stuffs must be placed in folds of moist cloths, and glazed with a hot iron.

Photog. Correspondence.

(Portraits can be copied on white silk to give a fair effect, if not too small: 4-4 size, or larger.)

PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

PROCEEDINGS AT THE REGULAR STATED MEETING, WEDNESDAY EVENING, APRIL 4, 1866.

Mr. F. A. WENDEROTH, Vice-President, in the chair.

Mr. F. T. Fassitt, chairman of the Library Committee, stated that there was considerable trouble experienced in finding works suitable and worthy of purchase. He had purchased Brand & Taylor's Chemistry, American edition, and Newman's Manual of Harmonious Coloring, American edition.

Messrs. William Sellers, William H. Horstman, and George B. Phillips, were unanimously elected members.

Mr. Wilson exhibited some mammoth interior photographs, made with Steinheil's periscope lenses, of various sizes; some photographic pictures illustrating Cariboo hunting in Canada, made by William Notman, of Montreal, and a number of pictures made with Dallmeyer lenses, of various sizes and styles; all of which have been herein described.

Mr. Nelson Wright, of New York, being present, said that he had lately received from Mr. Schnitzer (the former partner of the late Mr. Harrison, and co-inventor with him of the globe lens), a very curious and valuable combination of lenses. It has the property of producing an image at three different focal lengths, five, six, and eight inches; of course, increasing the diameter of the circle of light proportionately. It appears, too, to have the merit of working more evenly and quickly than other combinations. On a dull day, with a half-inch diaphragm, three seconds suffice for a field view.

Mr. Wright showed some prints made from negatives by the new combination, and one with a three-inch globe, all being taken from the same stand-point. The combination consists of two achromatic meniscuses, with a rotating diaphragm between them. The diaphragm contains three apertures, one of which is open, and the other two filled with dispersing meniscuses, each one having a different power. It is thus by the adjustment of the diaphragm that the different focal lengths of the combination are obtained. The advantage claimed for this arrangment is, that an operator in the field, finding the size of the picture not suited to the dimensions of his plate, can, by shifting the diaphragm, adjust the size to his satisfaction without moving his camera.

Mr. Wright said that he had brought the new tube to the Society's rooms at the request of Mr. Schnitzer, to exhibit it to the members, and that personally he had no interest in it.

Some discussion arose as to the disadvantage of changing the focus; when, on motion of Mr. Hugh Davids, a committee was appointed to examine and report upon Mr. Schnitzer's new combination.

The chairman appointed as the committee, Messrs. Davids, Browne, Norris, and Wilcocks.

On motion of Mr. J. D. Sergeant, the chairman was added to the committee.

Mr. Wright also exhibited an invention of his own, the object of which was to take pictures with moist plates, in the open air, without the use of a tent, or dark developing box. It consists in the addition to the camera, of a bath made of wood, and varnished in the inside with shell-lac; also of a developing trough of the same material. The latter was provided with a yellow glass back and front. The plate-holder was furnished with a whalebone dipper, which moved through an India rubber tube in the top. By giving the dipper a half turn, a plate resting upon the projecting piece at its lower end can be dropped through the bottom of the plate-holder into any receptacle placed to receive it. The bottom of the plate-holder could be opened or closed by a very ingenious contrivance. The back was attached to the frame only by its upper edge, and was free to move forward and back between the sides. It was so nicely fitted to the latter as to be *light proof.* To the lower edge of the back the bottom was attached. Thus by moving the back, the bottom could be opened or closed. The covers of both the bath and the developing trough were provided with longitudinal flanges, which were admitted into grooves in the tops of the bath and the trough. The under surface of each of the covers had in it an excavation, in which was placed a

stopper with an India-rubber face. When the cover was in its place, a screw in its top pressed the stopper against the bath and the trough, so as to be water-tight. The bottom of the plate-holder had flanges like the covers of the bath and the trough. When the plate was coated it was placed in the holder, which was then slid over the bath. The bottom of the holder being open, the whalebone dipper carrying the plate descended into the bath. When it was drawn up, the bottom of the holder was closed and secured by turning a button on the back. The plate-holder was then placed in the camera, and the plate exposed; after which it was slid over the trough, the cover of the latter being pushed away as the plate-holder advanced, so as to keep out the light. A half turn of the dipper now allows the plate to fall into the trough, and the cover of the latter is slid into its place, pushing off the plate-holder as it advances. By means of a gutta-percha funnel, three-fourths of an ounce of developer is poured into the bottom of the trough, and the opening closed, and the funnel removed. By a sudden movement of the trough, the developer is thrown over the plate, and the development watched through the yellow glass. The developer can be withdrawn, and water put into the trough to wash the plate before it is removed.

The invention contains many other minor contrivances, which are very ingenious and useful, but which cannot conveniently be described.

Mr. Wright was loudly applauded.

Mr. Wilson presented a solar camera print for the donors, Messrs. Draper & Husted, photographers, Ridge Avenue, Philadelphia, and moved a vote of thanks be offered to them, and also to Mr. Nelson Wright, of New York, for his interesting description of the new lens and apparatus, and for his kindness in exhibiting them to the Society this evening. Carried.

Mr. Sergeant exhibited a photograph of the United States Capitol, and one of the dome of the Capitol, made by Mr. L. E. Walker, of Washington. They were very fine, and much admired.*

* Will be fully described in our next.—Ed.

Mr. Wilson also exhibited a new kind of magnesium taper, made by twining a piece of iron wire with the magnesium, increasing thereby the length of the time of their burning to twice the original time the others burn; also a magnesium spiral, a very pretty toy for those who wish to see magnesium burn.

Mr. Wenderoth exhibited several negatives developed by different developers, and expressed his preference for the "old iron."

Dr. Thomson, of Washington, also exhibited some very fine negatives developed by his formula for gelatine developer.

Dr. Wilcocks rose for information in relation to two words used during the evening, that of focus, and equivalent focus; and suggested that it was a matter of importance to have the terms understood and settled.

Mr. Wright explained the terms, by saying that equivalent focus is the measurement from the diaphragm which is used about the centre of the combination. The focus given ordinarily is the back focus of the lens measured from the back of the instrument, and it arose from this reason: that in order to get camera box makers to make a box to fit a lens, you have to tell them how long the focus of the lens is, and so measure from the back lens. I suppose that is the way the term originated; and it was customary, in speaking of other lenses with which they were compared, to measure in that way from the lenses, measuring from the diaphragm, and calling it the equivalent focus from the diaphragm.

Dr. Wilcocks: That is a very satisfactory explanation.

Mr. Wright: In fact, in stating anything of a lens, it ought to be mentioned whether it is equivalent or back focus.

Dr. Wilcocks: I think the terms were not well chosen, however.

Mr. Wright: Unless it is equivalent to the combination of the two lenses. The term may have arisen from the resulting focus of the combination of the front and back lens. You take the front lens, and the focal length would be ten inches, measuring from the front; when you insert the back lenses, it is calculated it will take up one-half of the equivalent focus. The word is of no use, and might be well thrown aside.

On motion adjourned.

Salad for the Photographer.

Mr. A. J. Savage (Vincennes, Ind.), says, "Much has been said about the gelatine developer, generally favorable to it, but some seem to fail altogether to appreciate its merits, and fail to compound the article so as to use it at all. I think M. Carey Lea (who, I consider, has done more for this branch of the art than any man living) does not fully understand it. I think, and experiments have proven to my satisfaction, that acetate of soda has no business in the developer, but the contrary, if anything, is required after the saturation of the iron recommended by Mr. Lea's formula. But this saturation should not be allowed to be complete if we can discover the proper point to stop the action; this I have succeeded in doing with one kind of gelatine (the claret-colored gelatine or isinglass used extensively by milliners). This, dissolved in the diluted acid, retains its color until the iron is sufficiently digested for the developing purpose; it then assumes a rich yellowish hue, and should be reduced with four or five times its bulk of water, and filtered to another bottle, when it will be ready for use. If allowed to go on to saturation, the liquid becomes black or muddy in appearance, and loses its developing properties entirely until more sulphuric acid is added. I do not think it is then as good as when stopped at the proper point. I think the principal cause of failure in preparing this developer is in letting the solution become so rich as to form crystals of sulphate of iron in developing, the iron filings, and stopping the action before the acid is sufficiently saturated."

New York Photographic Society.—The following officers were elected for the coming year by this flourishing Society:

President—Lewis M. Rutherfurd.

Vice-Presidents—John W. Draper, Charles A. Joy, and Abram Bogardus.

Corresponding Secretary—C. Wager Hull.

Recording Secretary—Oscar G. Mason.

Treasurer—Henry J. Newton.

These gentlemen are all very well known in photographic circles, and under their administration we look for even greater prosperity than their Society has heretofore enjoyed.

Wooden Dippers.—Much trouble has been experienced with all kinds of dippers. Porcelain ones break easily, or falling out of the hands, go through the bottom of the bath; glass ones are apt to break, and hard-rubber dippers injure the bath more or less in a very little while. An excellent dipper may be easily and cheaply made of hickory wood, and will be found very nice, indeed. The only objection to them is, they are very light, but they can be made to stay down in the bath, by inserting a piece of metal in the top. Try them.

Another Novelty.—We were recently shown by Mr. M. A. Jennings, of our city, who is a very fine amateur miniature painter, another proof of the wondrous help photography is to the miniature artist. It was a picture painted on a thin sheet of ivory which had been pasted over a photograph. The photograph being strongly printed, showed plainly through the ivory, and no chemicals whatever were applied to the latter. Of course, painting them in this way insures a perfect likeness and no fear of fading. Mr. Jennings has *not* patented his process. It is free to all.

Vesuvian Tea.—Most chemists are familiar with that interesting experiment of manufacturing a spoonful of fine, crisp, well curled leaves of green tea from a crystal of bichromate of ammonia not bigger than a barley-corn. This experiment has now been introduced in parlor magic as a sequence to the Pharaoh's Serpents, by Messrs. Solomons, who supply small boxes of the bichromate and a small tin chafing-dish for applying the heat, all compact for public use, under the name of "Vesuvian Tea."—*Photo News.*

The editor of the News reports having recently tried two samples of developing *powders* sent to him by Messrs. Ramsden & De Latour, but no clue is given as to their composition. We may hear further from them.

The Universal Exhibition of 1867.—At the Paris Universal Exhibition to be held in 1867, M. Pierre Petit will have the monopoly of picture-making in the building. The contract has been awarded to him by the Commission for the sum of 60,000 francs. In addition to this, he will have to bear the expense of erecting his atelier, and he has engaged to make a reduction in favor of exhibitors of 25 per cent. on ordinary prices, and to take gratis all the pictures of those engaged in the exhibition, which will amount to some 20,000 or 30,000. His pictures moreover must be subject to the approval of the Commission. The Paris photographers are much put out by the granting of such a monopoly, though those who complain the most were themselves most anxious to secure it.—*Corresp. Photo. News.*

A correspondent of the Scientific American says, "A strange phenomenon took place here last week. An artist took a picture of a child (an ambrotype), and when he developed it there appeared in the background the head of a youth, about sixteen years old. He cannot account for it, as he says the plate was a new one, never used before. I think he must be mistaken. I think he redeveloped the outlines of an old picture. Will you please let me know how it could or did occur. I want to clear up some superstitious notions in this place. Anything but superstition for me."

Your theory is correct. The plate was an old one, not absolutely clean when used. The redevelopment of an old picture in this way sometimes occurs in photography.—*Scient. Am.*

We have known parties to make sittings, and find themselves unable to develop anything at all, for the same reason, namely—want of cleanliness. "Cleanliness is next to godliness," says an old adage, and it is in no place more true and applicable than in a photograph gallery.

Mr. J. Werge records in the *News* a very graphic and poetic account of a visit to the Potomac. He says, "its banks were peaceful, silent and beautiful." "The peach orchards were white with the blossoms that promised a rich harvest of their delicious fruit." We think he is on the *werge* of error, and must have got his authority from a photograph, as peach blossoms are usually a beautiful pink color. When he again approaches so near to the *werge* of poetry, we hope he will not fall over it into the surging pool of the ridiculous.

A hard-up portrait-painter complains that there is no chance for his craft, now that the sun is made to take likenesses. He says, however much others may praise the invention of sun-pictures, he considers it as decidedly hostile to the painter's calling. It is, in fact, he declares, the *foe*-tographic art!

A correspondent of the *British Journal*, in reply to another who complained that photographers did not make it a point of "honor and honesty" to see that their prints were thoroughly washed, so as to render them permanent, says, that the above "is of very little use, unless, when painted in oil, photographs are not painted *solid.* I have just returned from the studio of an oil colorist, who has lowered his price, and now finishes his painted work in glazings and scumblings only, that is to say, paints thin instead of solid. The result of so doing will be seen in a few years, when the oils and varnishes, having no couch of color to absorb them, will be sufficiently plentiful on the surface to form a semi-opaque, horny, yellow film, altogether destructive to the painting." We fear there is much of this kind of work done on our side of the Atlantic. Colorists seem to have fallen with photography to the low level of cheapness, and we hope the time will soon come when *cheap* photographs will be unknown, and that every man in the profession will endeavor to ennoble the art by asking a reasonable price for *good work*, and no longer degrade it and himself by trying to see how much cheaper and how much worse he can make photographs than his neighbor. The public is beginning to see the difference, and we trust the days of cheap photography are fast declining.

Light(en)ing the Sitter.—A photographer, in St. Paul's, Minn., recently discovered a new plan of *light(en)ing the sitter.* He relieved his victim of his pocket-book.

Editor's Table.

Errata.—In Mr. John R. Clemons' paper on "Measles," in our last issue, there was a slight error in the formula for silvering paper. For 20 oz. of alcohol read 2 oz. Mr. Clemons has just issued his various formulæ for silvering, toning, &c., in circular form, and will be glad to mail it to all applicants. His paper is growing rapidly into favor, and is good.

The Washington Delegation. — Messrs. Bendann Brothers, of Baltimore, Md., have sent us two fine groups of the most of the gentlemen who are giving their time and money for the good of the fraternity in trying to have the stamp nuisance removed. The group is very fine as a photograph, and consists of Messrs. Bendann, Germon, Gurney, Brady, and Fredericks. Though not there in person, we were in spirit, and are with them in both ways in their efforts for the good of the craft. The delegation will not soon forget the kind and cordial reception given them in Baltimore by the Messrs. Bendann, and we tender our sincere thanks for these pictures in addition to their kindness to us, while at their elegant rooms.

We have received from Mr. R. Newell, 724 Arch Street, some very pretty stereos of a Garden and one of "American Mechanics," showing bricklayers at work. While making the latter picture, Mr. Newell made the first exposure, and upon developing the plate, found both a west and north view of the street had been taken. It presents the very curious effect of men being seen at work through a solid brick wall; a house on the west side is entirely twisted around and across the street. Of course, the plate must have been exposed slightly in both directions, but the effect is decidedly curious.

Another *Genre* Photograph.—From Mr. J. Landy, Cincinnati, Ohio, we have received a very nice picture of a young sportsman with his dog and rifle, surrounded with the fruits of the chase in the way of game. The picture is very good, and we are glad to see Mr. Landy turning his attention to such work. We believe that therein lies the future of our glorious art, and we hope to hear of many more efforts in that direction.

Gems of Kentucky Scenery.—From Messrs. Carpenter & Mullen, Lexington, Ky., we have received a half dozen of well-taken and very pretty stereos, viz.: "Indian Creek, looking up," "Cogue's Ferry," "The Lover's Leap," an almost perpendicular rock, six hundred feet high, "Shaker Ferry Road," "The Mirror," and "Bridge over Indian Creek." "The Mirror" is a little quiet lake in among the rocks. Three persons are lounging near its edge, and they, with the rocks and trees adjacent, are reflected in the water, thus giving us a second picture of them almost equal to the other. The "Bridge" quickens all the romance in one's nature. It is a charming picture, and the gem of the lot. The entire scene,—the old mill, the old flat wooden bridge resting on crumbling walls, and an interested couple talking in the shade, with the quiet that seems pervading,—is very romantic.

Another New Gallery.—Mr. William H. Rhoads, No. 1800 Frankford Avenue, has sent us a photograph of his new photograph gallery just completed. It is two stories high, fifty-five feet deep, and was built entirely and solely for his business. It is a very handsome building, has a nice double front, a first floor entrance and large skylight, and seems very convenient. Another evidence of the growth of photography. Success to it wherever it may go.

The Paris correspondent of the Chemical News says, "Have you heard nothing of a discovery said to have been made by M. Carey Lea, who has found that a plate prepared with chemically pure iodide of silver will give you a picture of any object simply pressed upon it in the dark?

"The picture is developed by the ordinary agents in the usual way.

"If it be true, this is a most extraordinary discovery, and will lead to most important conclusions."

This singular discovery by Mr. Lea seems to be attracting more attention in chemical circles than in our own. We should like some of our readers to try it, and report the result to us. It will certainly be an interesting experiment.

Prof. Fairman Rogers' Lecture on the Glaciers, delivered at the Academy of Music, Tuesday evening, March 27, was another great proof of the growing interest in matters of science in our city. The lecturer illustrated his subject by diagrams, by colored views of the Glaciers, and

by photographs from nature thrown on the screen by the magic lantern. Photography was one of his main assistants, and it is pleasing to know what an important part it is made to perform in science. It would have been impossible to deliver such a lecture, or to convey any such idea of the beauty and wonders of the Glaciers as did Prof. Rogers, without the aid of our beautiful and wondrous art.

Another Fire.—Messrs. French & Sawyer, of Keene, N. H., send us two photographs. One is of the ruins of their gallery destroyed by fire in October last, and the other of their new and beautiful saloon on the site of the old one. While the new one was building, they did business in a small structure erected near by, which they also send a photograph of. Their loss was about three thousand dollars, including about seven thousand valuable negatives. They are now doing finely in their new rooms.

Photographic Mosaics.—"This little book, as its title indicates, is a kind of rich mosaic, containing an excellent selection of one hundred photographic curiosities, articles chosen with as much judgment as variety from all the journals that treat of photography. The publishers have conscientiously mentioned the different books to which they had recourse. We have also met several articles in their book which have been inserted in the Bulletin. Not only we read this book with pleasure and benefit, but we are surprised at the multitude and diversity of matters which have been introduced into so small a volume. It is a guide indispensable to all operators, and all those who have a sufficient knowledge of the English language will be willing to consult it, and will never consult it without benefit. When we have told you that the first thousand copies of the first edition were exhausted before the bookbinders had finished their work, and that the second edition is already nearly exhausted, then we will have given an idea of the good reception this little work has met with, and its cheapness increases its merits. We shall sometimes take useful extracts from it."

The above friendly remarks we extract from our esteemed contemporary, The Bulletin Belge de la Photographie, published in Brussels.

We are continually in receipt of letters of praise and appreciation of our Journal, which cheer us to make further effort. Mr. Charles Wager Hull, one of the oldest amateurs in the United States, says. "I have never received more for my money than you furnish. Any photographer who lives in ignorance of *The Philadelphia Photographer* is to be pitied. Surely, he is but *half developed*." Mr. William Roddy, of Conneautville, Pa., writes that he "saves more in *one month*, by taking this Journal, than the subscription costs for one year. Mr. Lea's paper on Perspective is something we have been long looking for, and will be fully appreciated."

Of Photographic Mosaics a correspondent says, "When last in New York, I found at Anthony's a copy of your 'Photographic Mosaics.' I must admit I felt many suspicions respecting it, and brought it home with some reluctance, for I had wasted much of my time in endeavoring to carry out ideas suggested by sundry works on Photography, and which could not be carried out successfully, but I am pleased to say that I have been richly repaid by overcoming first impressions in this case."

Caution.—A short time ago we cautioned our Western friends against a certain L. D. Furlong, who was at that time going about victimizing and swindling photographers. We learned a few days ago that he had been in our own city, and had successfully swindled two of our ferrotype men. He reported that he was with Mr. S. M. Fassitt, of Chicago, and had been sent here to learn how to make pictures on watch dials, but he had been robbed in the cars, and wanted to borrow money to telegraph with and pay his way until he could get a remittance from Mr. Fassitt. We wrote to Mr. Fassitt about him, and learn that he has not been in Chicago for over a year. Mr. Fassitt says he has heard of four persoms who have lately been swindled by this individual.

He is a tall, rather slender man, of fair complexion, and rather prepossessing at first sight. He is of good address, and likely to deceive almost any one. He sails under various aliases, some of which are J. D. Farlan, J. D. McFarlan, and George Bernard. Our friend Carbutt has sent us a picture of him, which we will be glad to show to those who desire it. Look out for him, and have him arrested if you can.

The Revenue Tax on Photographs.—While no positive action has yet been taken by the Committee on this important question, we have many reasons for hoping and believing that everything is going on nicely, and that we shall be successful. In our next, we hope to be able to announce that our object has been accomplished.

THE

Philadelphia Photographer.

Vol. III. JUNE, 1866. No. 30.

THE GLASS-HOUSE.

More and more interest seems to be taken in the construction of the glass-house as our art progresses. How to secure the best mode of lighting the model, and how to construct the atelier, have become quite as important questions as what lenses or collodion or developer are best? The idea that any room with a top or side light in any convenient locality and direction is good enough for making pictures, is becoming emphatically exploded, and there is a growing desire among artists to find out the best way to construct their lights in order to secure the best results. So much has been said and written about it, that we can hardly promise anything new, yet we have so many applications from parties who have been awakened, for instructions, that we cannot see that it will be out of place to record a few hints upon the subject.

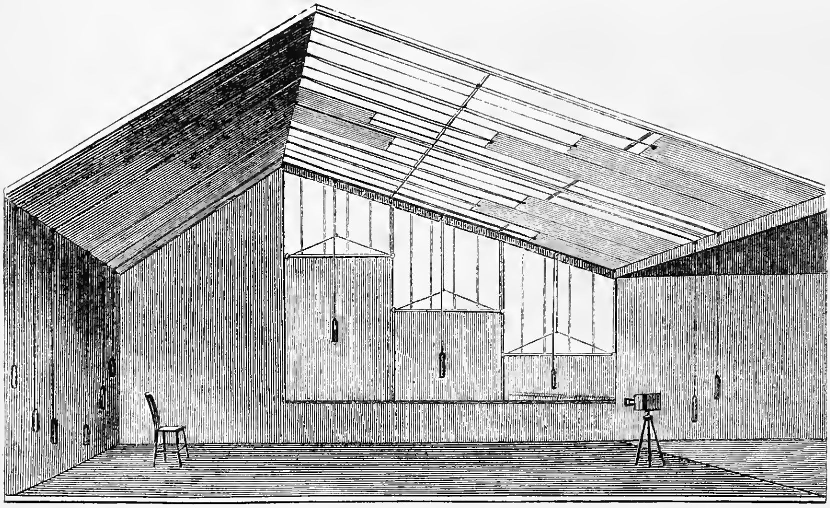
The thing of first importance is to select the locality for the glass-house. This should be done with much care, and well considered before any decision is made. We should not disregard the fact that the *quality*, and not the *quantity* or *intensity* of the light, is the great requirement to be sought for. A strong light produces unpleasant and inartistic shadows, and contracts the features of the model. Consequently, the direct action of the sun's rays should generally be avoided. Only a practised hand and a truly artistic eye can manage such light to produce good effects, and these qualities are not possessed by most of us, we fear. Care should be taken to secure a proper elevation for the glass-room. The "first floor" principle adopted in some of our cities is a wrong one, unless the buildings on each side are low. No neighboring tall buildings should be allowed to interfere and exclude the light on either side. The horizontal light is needed to enable us to make quicker exposures, and to obtain easier access to the light.

Though the sitters may complain of having to climb so many stairs, we can promise them better pictures, if they will "come up higher." We know of two rooms in our city, almost foot for foot the same in size. One is a story higher than the other, and of course, in the higher the best effects are obtained.

Having then secured a proper place, how shall we build the glass-room? One part should be open to the north, another to the east, a third to the west, and the south side should be closed. In many cases it will be found impossible to have a side light; but if this be so, care should be taken that the inclination of the top light is toward the north. It would be better to elevate the room, even a story higher to get one side light at least. It will make all the difference in the world to your sitters. In fact, it is almost a ne-

cessity that the model should face the north in order that there need be no contraction of the features by a too powerful light. Even should a dark wall be on the north side of the room, the sitter should face it or nearly so, and the south should be the dark side.

Below is a diagram of the glass-room of one of our best photographers, Messrs. Henszey & Co., 812 Arch Street. We think it compares very favorably with any light in our city, and we consider it one of the very best arrangements and a safe model to go by, in constructing a glass-room. Although in some respects the same, the inside arrangements are different from the one described in our December number, and it is lower. The view given of it is from the east side, thus showing the arrangement of the top and one side. Of course, then, the side we see is the west side; by the chair we see where the model is placed, and the camera and stand, point out the space near which they are used. The dimensions of the room are as follows:



Width of side light, ...	13 feet.
Height of " " at the lowest point,	6 ft. 10 in.
" " " " highest "	11 ft. 9 in.
Distance from the floor to the bottom of the side light, ...	14 inches.
Width of the top light, ...	17 ft. 6 in.
Length " " "	15 feet.
Depth of the room as shown in the diagram, ...	32 feet.

It will be seen that instead of blinds, curtains or shades are used to modify the light, both at the top and on both sides. By a proper arrangement of weights, pulleys, &c., they are made to change the light as the operator may desire. If the light be too strong from the direction of the top or side, the curtains are drawn so as to soften the shadows, and secure such relief as is found requisite. These curtains may be raised or lowered to any extent; so it will be seen that by their use almost any modification of light may be secured. They are made of blue muslin, and therefore admit only the kind of light needed. Experience must teach the proper use of them. On days when the sun shines directly upon or in the room, the whole of the curtains should be used, and at other times they are arranged as they appear in the diagram. Now, to prevent the illumination being too great on the side of the model next to the light, a white screen is placed on the other side, in order to reflect the light in the direction desired. A screen covered with silvered paper is sometimes used, and occasionally a mirror for the same purpose, but we are inclined to think the white screen of muslin or paper would be the best. Blue screens are sometimes used for a like purpose. It will be understood that in posing in such a light as this, care should be taken that the light does not fall upon the sitter vertically. This may be prevented by the use of the curtains. The

rays of light should have a certain inclination, as it were. In the diagram the chair has been placed by the engraver rather too far back, or more so than it is usually used. It has been suggested that another window be added to the side light, in order to secure a light between the sitter and the background. We think this would be a great improvement, and add much to the softness of the picture. *This lighting from behind* is practised in Germany, we believe, and is one of the secrets of the success of those beautiful Berlin cartes noticed by us some time ago. We hope to say more, and to speak more definitely and certainly as to that before very long, as we have received the photographs from Berlin to illustrate a future number, but are waiting for the drawings of the skylight. In closing this part of the subject, we would add that there is more *art* in *lighting* the model than most are willing to concede. A mild, soft light is what is required. A strong illumination produces shadows of great intensity, and often contracts the features of the model. This is why some people complain that their pictures make them look older than they really are.

This room being a wide one, it is divided into two apartments by a large curtain hanging from the roof to the floor. Either or both sides may be used at pleasure. One model will require an east and another a west side light. In the morning the east side of the room must be shaded, and in the afternoon a similar change must be made on the west side. The accessories of the skylight should have some care and attention. One or more nice chairs should be secured, and an easy little lounge for children, together with such other tasty pieces of furniture as the artist is able to afford. The background must be selected according to taste. Some prefer a dark one. We prefer the woollen or flock background to any other, and of a light, neutral tint. The effect of a background can only be told by actual trial. What would work nicely in one light would be found objectionable in another. The unglazed portions of the room should be painted or papered with blue or some neutral or grayish color. In Messrs. Henszey & Co.'s light, blue is used of a rather light shade.

It is often asked what kind and size of glass is best to use? As to size much will depend upon the size of the building. Glass in as large pieces as practicable should be used, as less light will be interrupted by framework. In the diagram it will be seen that the framework is made so that the glass may be arranged in rows, the pieces overlapping each other. A good strong window glass is good enough, though crystal glass is better. Blue frosting is almost universally used to color the glass, and can be highly recommended. It gives free passage to all actinic rays, and enables the artist to place his model with great advantage. The curtains described above are also used with the blue-frosted glass, as at certain times of day they are needed. In placing this blue frosting upon the glass, great care should be taken not to get it on too thick. It should not be painted, but *stippled* on. To do this, take a large paint brush, and wrap it with twine to within two inches of the end of the bristles. Dip the brush in the frosting, and carefully and uniformly stipple it on to the glass. This requires patience, and care, but it amply repays for the trouble. Ground glass should never be used, as it absorbs to a very great extent the chemical rays of light most needed in photography, and at the same time allows too much bright light to pass. One of our eminent photographers (Mr. Gutekunst) some time ago took great pains, and went to great expense to have ground plate glass put in his top light. It was but a short time before the ground glass was displaced, and the blued substituted. A short time ago Messrs. Henszey & Co. removed the blue from their top light, and attempted to use the plain glass. The blue frosting was replaced in about a week afterwards. It is now being almost universally used in our city.

During certain seasons of the year the light from the south shines too directly upon the roof of the glass-room. This is overcome by wooden screens placed upon the roof, and so arranged with block and tackle that they can be raised and lowered at will.

The ventilation of the glass-room should not be forgotten, and can be best secured by the architect. The arrangement of the dark-room must also be made to suit the

building. We may have further remarks to make concerning it in future.

We have endeavored to offer some useful hints concerning the construction of the glass-house proper, and the diagram presented we believe to be of a capital plan. To illustrate this paper more fully, we have had a picture made in their light by Messrs. Henszey & Co., which we call "*The Pets of the Family*," and must not forget to thank the little pets for sitting so nicely for us, and present it to our readers in this number. Next month or the month following we shall treat upon another variety of pictures, and give a diagram of another skylight.

ON THE FOCAL LENGTHS OF PHOTOGRAPHIC OBJECTIVES.

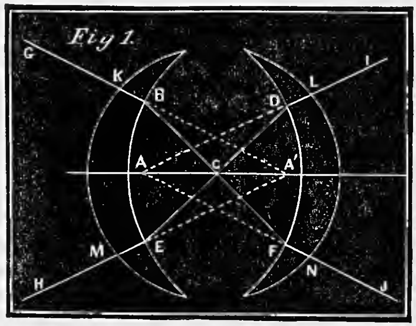
BY M. CAREY LEA.

I PUBLISHED a few months since* some remarks upon this subject, citing some simple practical methods of determining equivalent focal distances. My paper has been made the text of an article on the same subject by Dr. Weiske, who, however, disagrees with some of my views, which he holds to be erroneous. It will, I think, be very easy for me to show that I am right, and I undertake it the more readily as I believe that the views of Dr. Weiske are held by a good many.

First, then, I spoke of the very common error of supposing that the equivalent focus of a combination could be determined with exactness by so focussing an object that its image should be of exactly equal size with itself, and then measuring the distance between the object and the ground glass, and dividing this by four. How this notion has obtained so wide a circulation I cannot understand, for it is but a clumsy approximation, and almost, if not quite, as much trouble as Grubb's methods, which I cited in the paper above referred to, and which give accurate results.

It would seem more natural that those who consider this system correct, should prove it to be so, rather than to require me to show its incorrectness. That is, however, not very difficult. The error arises from forgetting that although rays that pass through the optic centre of a lens, have their direction of emission parallel to that of entrance, they are, nevertheless, deflected during that portion of their path that lies between the exterior surfaces of the combination.

Let G K and H M (Fig. 1)* be rays of light entering a doublet lens (corrected for color or not; it is in this case unimportant). These rays are refracted at both surfaces of the front lens; let us suppose them to pass



through the optic centre, C; they are then again refracted by the second lens, and pass out of it in directions, L I and N J, which are respectively parallel with the original directions, H M and G K.

But although L I, for example, is parallel with H M, it is not continuous with it. If the entering rays, G K and H M, be produced in their original directions, they will meet at a point, A′, on the axis. L I and N J similarly produced will meet at another point, A. Each of these points is the apex of a cone of rays, A′ of the entering cone, G K, H M, A of the emitted cone, L I and N I.

It is for want of distinguishing clearly between these points, A A′, and the optic centre, C, that so many mistakes are made in connection with the measuring of focal lengths. When an object is set up and focussed full size, and the fourth part of the distance taken between the object and its image, as so often directed, the result found

* See *Philadelphia Photographer*, vol. 2, p. 173.

* I need scarcely remark that it is very difficult to have cuts executed so as to exhibit the paths of the rays correctly. In Fig. 1, for example, the line K B should, of course, not be continuous with G K, but slightly refracted. The figures will, however, sufficiently illustrate the principle.

is less (in the ordinary forms of lenses) than the real equivalent focus, by one-fourth part of the distance, A A′.

If G K, H M are the entering rays, then A will be the centre of the emitted rays, and the distance from A to the centre of the circle of light will be the true focal length, and will, when the focus is taken on very distant objects, be the equivalent, principal or absolute focal length, as it has been variously called, of the combination.

There exist various ways of determining the true focal length correctly. The simplest in practice are those of Mr. Grubb, which I already gave. Another is as follows: Select two very distant objects, and measure the angle which they subtend, with a theodolite. Place the camera so that the images of the two objects may fall equi-distant from the centre of the ground glass, and measure their apparent distance from each other on it. If ω be the observed angle, and d the distance between the images on the ground glass, the focal length of the lens will be

$$f = \frac{d}{2 \tan . \frac{\omega}{2}}$$

That is, half the distance between the two images divided by the tangent of half the observed angle, will be the focal length sought, and the equivalent focal length so found, if measured from the focussing surface will fix the point A, the apex of the cone of emitted rays. A corresponding mark may be made on the mounting of the lens.

These points, A A′, are of the utmost importance in considering the properties of lenses, and combinations of lenses. Mr. Shadbolt, in the passage which I spoke of in the former article, speaks of the true focus being shorter than that determined in the common and erroneous way above referred to. This is only true in particular cases, and must have been mentioned by him, I think, in reference to those cases, but I cannot now find the reference to the passage in which he speaks of it. The truth is, that the points, A A′, may occupy any position in reference to C, and the cones may cross each other, as in Fig. 1, or the points, A A′, may interchange positions, and fall each between its own lens and the centre, C.

However, in the globe, and in most other photographic lenses, the cones cross each other as represented in Fig. 1. That this must be the case will be immediately evident, if the lenses be drawn on a large scale, and the paths of the rays be correctly laid down. It will be found that in the globe lens, for instance, the ray, G K, will be bent downwards at the exterior surface, and again at the interior surface of the front lens, so that it necessarily reaches the axis at a point *nearer* to the front lens than the prolongation, B A, of the original ray.

But the position of the lenses and the curves may be so altered that a ray to pass through the optical centre must receive its deflections at the exterior and interior surfaces in an opposite direction to that represented at Fig. 1, and in this case the cones will not cross.

In considering this matter, a curious case has presented itself to me. The curves of the lenses and their relative thicknesses and positions may be such that the deflections at the two surfaces of the front lens will be in opposite directions, and may exactly compensate each other, so that in this very exceptional case the two apices, A A′, may become coincident with each other, and fall upon the optic centre.

To make this plain, we must represent a part of the lens upon a large scale, and of exaggerated thickness, as in Fig. 2. Let O and O′ be the centres of curvature of the anterior and posterior surfaces of the meniscus, A B D E, one of a pair of identical lenses having the optical centre of the

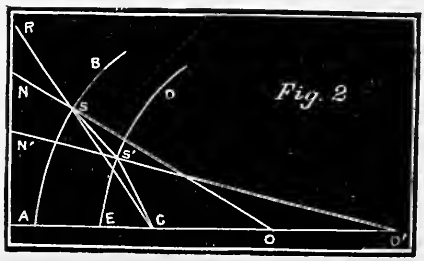


Fig. 2

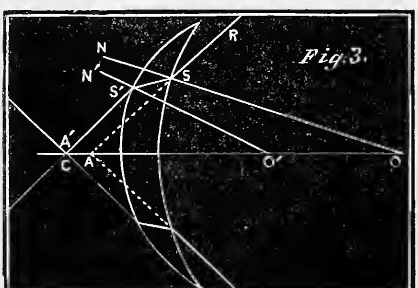
combination at C. Let R be a ray incident at S. It is there bent out of its direct course, S C, towards the normal, O N, and reaches the second surface at S′. Here it is bent away from the normal O′ N′ of the second surface, and if the curves are appro-

priate, it may reach the optical centre, C, causing all three points, the apices of entrance and of emission, and the optical centre to be coincident. In the figure the lens has been made very thick, and the two lenses supposed to be very close to each other, in order to make the path of the ray evident, and keep the lines from a confusing proximity which would otherwise have resulted.

This will, I think, be sufficient to prove the correctness of what I have said as to the inaccuracy of the common mode of proceeding. On the other hand I find a statement in Dr. Weiske's paper which seems to have been rather hastily made. He remarks, "With the achromatic landscape objectives, which consist simply of a crown-glass lens with a flint glass lens in close contact, this (the determination of the focal length) is easily carried out in practice. It is only necessary to measure the distance between the lens and the image of a very distant object, as for example, the sun or the moon, thrown by it upon the ground glass. The distance from the middle point (Mittelpunkt) of the lens is the focal length sought."

The law which fixes the focal length of a meniscus objective is different from that in the case of the combination. In the meniscus, *the apex of the emitted cone is coincident with the optical centre*, and from that optical centre, not the actual centre, the focal length must be measured.

In Fig. 3, let O O′ be the centres of curvature of the faces of a meniscus lens,



exposed, of course, with its concave surface towards the light. Let a ray of light, R, be incident upon the first surface at S at such an angle that it will, after refraction, pass through the optical centre, C, which in the case of a meniscus presented with its concave surface to the object, as usual, is always outside of the lens on the convex side. It will at S be deflected towards the normal, O N, and reach the second surface at S′, where it will be deflected away from the normal, O′ N′, of the exterior curve, and will pass through the centre, C. As there is no second lens, it will suffer no further deflection, and therefore the optical centre is in this case, also, the apex of the cone of emitted rays. If the ray, R S, be produced, it will cut the axis at a point, A, which is the apex of the cone of entering rays. The distance from the point, C (and not from the actual centre of the lens), to the focussing screen, will be the equivalent focal length.

In order to show how incorrect is the common mode of measuring the focal length of a meniscus from the back surface of the lens, it is simply necessary to observe, in Fig. 3, how far the position of the optical centre, C, is removed from the actual centre of the lens. It will be seen how far behind the back surface it is situated.

The "back focus" which is so much used in describing lenses, and which is the distance from the posterior surface of the back lens to the focussing surface, is liable to this very serious objection, that it is not merely a very rough approximation, but that its incorrectnesses are in opposite directions in different lenses. The "back focus" of a meniscus is always materially longer than the true focus, whilst it is shorter than the true one in the case of a combination objective.

ON CORRECT FOCUSSING IN PHOTOGRAPHY.*

BY LEON VIDAL.

As one art nears perfection, it is necessary to hunt up in every one of the special points that constitute the whole, more precision, more facility, and more operative certainty. So it is with the photographic art.

* Translated from the "Moniteur de la Photographie," for *The Philadelphia Photographer*, by "Proselyte."

The point was to create this marvellous science; this done, progress has led us to the actual advanced stage, though it be far off of the end to be expected from it. The first and most assuredly the most difficult obstacles surmounted, quiet was to be expected; to the period of great discoveries was to succeed the period of improvements, of details. The machine erected and set in motion, it was necessary to examine one by one, every piece, and to retouch them so as to proceed, as always does human nature, from the compound to the simple, from nearness to perfection. That work of maturation is the one on the way of achievement now, and it is only when it will be completed that photography taking a new flight will aspire to newer and great invention.

From the triple point of view of physics, chemistry, and mechanics, many pieces of the photographical machinery have been improved; to prove this, it suffices to compare the primitive lens used by Daguerre with those of Dallmeyer and Ross in England, of Secretan, Hermagis, and others in France, to bring in presence the old magic lantern and the dyalitic apparatus, with corrected aberrations of Dr. Van Monckhoven. The same can be said of the results; what a difference between the negative and the mono-specimen on silver-plated sheet. Every day, nay, every hour brings to more perfection in detail, more rigorous and mathematical precision; a laudable emulation exists between the opticians, the manufacturers of cabinet-work, of chemicals, of photographic papers, &c. It is whom will make the best, the simplest, the most economical. Do not be surprised, then, that we, modest amateurs, should be anxious to perform our part, however trifling it may be, in that unanimous concert of the seekers of our art, and that we should dare to offer our improvement, though it may not be essential.

Has great importance ever been attached to the correct focussing of images to be reproduced in the camera? and has any one searched the means to render that focussing perfect, rigorously exact in all cases where it is absolutely necessary, as for instance in the reproduction of engravings, in the execution of small negatives destined to solar enlargements? This is very simple and, nevertheless, of first importance, for it could not be neglected without rendering impossible the perfect execution of photographic images. In view of all the above, we have asked ourselves whether it was not possible to bring to that operation, which is to-day performed as it was of old, an improvement, and should that improvement exist to enhance the scientific value of photography.

Of all photographic operations the focussing is the one the least possible to dispense with; it is, therefore, essential to execute it with all possible exactness, for on a correct focussing of the image depends the distinctness of the proof. In the apparatus now in use, the focussing is performed on a ground glass, the internal surface of which, that is the one screening the image, occupies, or at least ought to occupy the same plane as the sensitive film of the collodion plate. Although it is exceedingly difficult for a cabinetmaker to rigorously replace one plane by another, many cases occur in ordinary practice, when the degree of precision obtained is sufficient. But in cases where it is indispensable to obtain a rigorous precision, the same means as above cited are employed, and no certain way has, to our knowledge at least, been indicated to make focussing easy and exact. One case where this point is difficult is, when, with a small diaphragm and long-focussed lens, engravings are to be reproduced.

Indeed, nearness does not suffice when you have to deal with copperplate engravings. The negative proof must represent the original in all its purity; the finest and slenderest etchings must preserve their relative value; the least difference in focussing, one turn more or less of the rack, creates a sensible imperfection. It is indispensable to be certain of the correct point, and that is very difficult, when you follow the usual errors; the length of focus and the limited dimensions of the diaphragm admit of but a very obscure image on the ground glass, and the eye left to its own powers distinguishes it with difficulty. All this renders the seizing of the exact point difficult, if not impossible.

The most expert eye will not perceive a difference in the sharpness, even at a varia-

tion of one centimetre in the drawing of the box, and it is evident that one exists, but that difference hardly perceptible on the screen becomes a crying imperfection on the negative. The difficulty we here bring to notice has not escaped any one occupied with the reproduction of engravings. Others, as well as we, have observed that generally the correct point within determined limits is very arbitrary, and that several operators in successive search of said point will, each of them, stop at a different one. You will, however, admit with us that there is and can exist but *one optically exact focus;* that is the one to be determined, and the one that offers great difficulty in discovering, and this last not without horribly fatiguing the eye. The use of a magnifying glass has been advised, but that help is a difficult guide in this matter, and we do not believe that it would lead to find the correct focus.

To obtain more light, whilst focussing, some operators introduce a larger size diaphragm than the one intended to be used at time of impression ; but this fault is a serious one, and will jeopardize the sharpness of the negative, for the focus varies sensibly in ratio of the openings of the diaphragm.

When occupied with solar enlargements, one is very soon brought to know that the perfection of the original negative, of the small image to be enlarged, comes in for a great deal in the perfection of the result of the magnified image. It is easily understood that the least defect, invisible on the small primitive negative, acquires proportions susceptible of destroying all value in the result, when it constitutes an enlargement of two hundred or three hundred surfaces, and sometimes more. The defect, at first invisible, but magnified in the same proportion, then becomes the dominant feature of the proof, and forcibly strikes the eye.

It is, therefore, essential to use none but perfect negatives. Here, again, appears the difficulty we pointed out above. How can we correctly focus a collection of objects on a limited space, such as is obtained on a quarter plate with a short focus lens? The rugosities of ground glass are an impediment to the distinct appearance of the image without any diffusion of the rays of light, and this exists no matter how finely the glass is ground. In this case, again, the operator must trust to hazard and wait for the ultimate result to ascertain whether he has been, at the moment of focussing, *well inspired.*

These special considerations derive from the important preoccupation of the moment, *i. e.*, the art of enlargements, a very serious interest. However perfect a process of enlargement may be, it is incomplete as long as it does not comprise all means of reaching the desired result, say, from the obtaining of a perfect negative to the production of a fine magnified proof. As concerns this, the improvement we propose deserves to be considered in the number of those playing an important part. The two preceding examples are sufficient to prove that cases exist where a precise focussing is absolutely necessary. It is, therefore, useless for us to dwell on other examples, that every one will find when a high degree of precision is needed. It remains for us to complete our study, and to give it a character of utility, to point out the means of substituting for the seekings of actual practice, the mode of arriving at a really exact focus.

This course has not been invented by us; it is to be found in the micrographic apparatus of Messrs. Dagron & Co. It is undeniable that the focussing, in this special application, is absolutely impossible, if we follow the ordinary road. When the proof is reduced to hardly a square millimetre, it is impossible for the eye to perceive the most striking parts of the image. It is, therefore, necessary to call to help, optical aid, a real microscope, with the aid of which the enlarged image may be seen, both regulated in such a way that it brings it on the same plane with the focus of the lens. That instrument, which is nothing but a four-lens eye-glass, is combined with the objective, and forms a real spy-glass. The image which, on the sensitized film, occupies but a very limited space, is by this way seen, much enlarged, and very distinct, for there is no ground glass.

It will at once be seen what facility is obtained with such a disposition. An error of half a millimetre is impossible, and the point is found without the protection of a

dark cloth against the diffused rays, and the point thus obtained is assuredly the only true one. In this manner all hesitation is obviated, and if the result is not satisfactory, the cause evidently lays not in the focussing, admitting, however, that the plane of the sensitized film will correctly coincide with that one where the image is most perfectly defined. Here, again, for the special application above enumerated, a means of certainty would exist, if we would only correct the errors of custom. Generally, the frame holding the ground glass is exchanged after focussing for the one holding the sensitized plate. This process, which, in usual circumstances, gives a satisfactory approximation, becomes or can become a constant cause of error, when absolute precision is required in an operation. We are then victims of the warping of the wood, of the negligence of the cabinetmaker, and lastly, of that material impossibility to obtain absolute coincidence of the two surfaces on the same plane. Would these causes of error exist, if the sensitive plate took the place of the ground glass in the same plateholder? It is evident that no other means would produce a similar precision, and we do not see what objection could be presented to, may it be for dry or wet processes, this substitution of the sensitive film to the screen itself, for the two internal surfaces would, then, be compressed between the same partition of one and only plateholder.

We have adopted this system for the use of our auto-polygraph, and completed this means of precision by the addition, in the rear of the groove, of an eye-piece, which once regulated, dispenses with the use of any screen. We believe it is useful to give a few explanatory words to those unfamiliar with the setting of that optical instrument, and therefore unable to regulate it. When the eye-glass is conveniently placed on the prolongation of the axis of the lens, it is only necessary in case of use to direct the whole, as would be done with a spy-glass, on the object to be reproduced; then looking through the eye-piece, and setting the rack in motion, a satisfactory degree of distinctness is soon arrived at, but the image is much larger than the one produced on the sensitive film.

Nothing proves yet that the eye-glass will bring the image on the same plane with a ground glass placed in its groove. It is necessary to bring the two planes to coincide, *i. e.*, the one where the image is formed, and the one occupied by the sensitive film. It is easily overcome; instead of a ground glass, introduce an ordinary glass, the internal surface of which will bear very light scratches made with a diamond. But using the eye-piece, those scratches are much enlarged, and the flaws and splinters in the glass are distinctly seen. Now run your eye-piece in its tubing until those imperfections, at the same time as the image to be produced, appear in their utmost distinctness in this position. A little mark at the intersection of the eye-piece and its tubing will always indicate on the instrument its true position, when using the auxiliary we propose. As it is often useful to see on the ground glass the effect of the image to be reproduced, we have imagined a screen constructed specially for our instrument, and which can easily be applied to any one, where the use of the eye-piece is desired.

Our ground glass differs from the ordinary ones in use only in the circular polished centre space, and quadrilated with a dividing instrument, so that the horizontal and vertical divisions are exactly at a distance of a millimetre from each other. In this way we have a real micrometer, allowing the correct measurement of the magnified image, and straightened through the eye-glass.

The disposition of this micrometer adds to the accumulation of the means of precision we have enumerated above; its divisions are traced in a parallel manner with the vertical and horizontal sides of the glass, thereby permitting in cases of reproduction of monuments, plans, &c., to mathematically obtain the perpendicular, or at least an appreciation of the deviation.

The whole of the system we have just described is very simple, however detailed may be the explanation into which we have been compelled to enter. Our principal object was to show once more how many improvements our art is susceptible of, and we could not come to it in a better way than in taking, for example, the one on which everything appeared to have been said or done.

Moreover, it was an evidence of our fidelity to the conviction that photography will become for the arts an auxiliary all the more powerful as its means of precision are rendered more perfect.

PHOTOGRAPHY AT THE CAPITOL.

OUR readers are aware that our Government employs photography to a great extent in different departments, and found it of vast importance during the war. Mr. L. E. Walker, photographer in the Treasury department, has recently made an admirable copy of the fresco in the canopy of the dome of the Capitol building, recently finished and exposed to view. Had the painting been outstretched in front of and within six feet of the camera, we do not think it would be possible to get a more successful reproduction. It is a real triumph, and the more so, when we learn what difficulties had to be surmounted before such a result could be effected. As all will be interested, we will not go amiss in making the following abstract from a letter received from Mr. Walker:

"The picture is one hundred and seventy feet from the floor of the rotunda whence the photograph was taken; is sixty-five feet in diameter, with a curvature of twenty feet. The windows in the dome are eleven feet from the edge of the painting, and three feet above it; consequently, little or no light is received from them. The light proper comes from the windows in the drum of the dome, forty and eighty feet below the fresco, and is consequently diffused and weak. Thus much for the picture and its position.

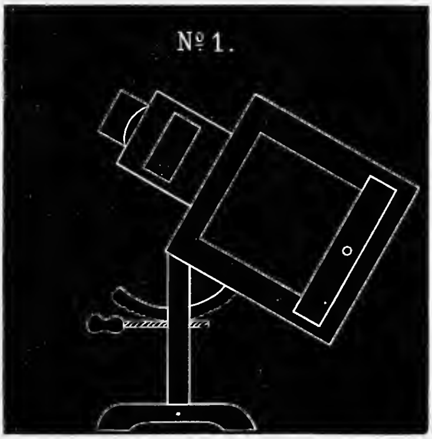
"When about to photograph it, my first care was to construct a proper stand whereon to fix the camera. This was made of four pieces of scantling, about seven feet in length, united in quadrangular form by narrow strips of boards. A sectional view is inclosed. Inside this stand, to the top and middle rails of one side, was fastened a board, about five feet in length, and perpendicular to the floor. To this was firmly screwed the camera, with ground glass, when in focus, about six feet from the floor. Thus arranged, the front lens of the instrument was pointing to the ceiling in proper position for work. The lens employed was a Dallmeyer portrait—back focus of eighteen inches, and designed to cover a plate 15×15. Size of stop, one and three-fourths inches. Time of exposure, from fifteen to twenty minutes. Collodion, ordinary view or portrait. Developer: protosulph. iron, $1\frac{1}{4}$ oz. to 16 oz. water; about one-sixth in volume of acetic acid, or just sufficient to cause it to flow evenly, and sixty drops of sulpho-gelatine, made after Dr. Thompson's formula ($\frac{1}{4}$ oz. gelatine to 16 oz. water). I have never yet become an enthusiast in the use of gelatine in development, but believe if properly used, it is very useful. If one acts on the principle, a 'little being good, much must be better,' he will meet with sad disappointment. Used in moderation, as the subject, the collodion, and state of silver bath require, it will be found a valuable assistant. If at any time reinforcing be required, I add a little larger proportion of gelatine to the iron and much prefer it to pyro. It can be managed equally well with the latter, and has the triple advantage of not requiring the negative to be washed before re-development, not loosening or making tender the film, or so permanently staining the hands."

We certainly think Mr. Walker is entitled to great praise for his care and success in this instance. He has shown that the thing can be done, and if others follow him, those who cannot look upon the original painting may obtain a copy of it. Mr. Walker also sends us two photographs from drawings, showing the position of the painting, the interior of the dome, and the source of light upon the picture. He also sends a sectional drawing of his camera stand, but the description given by him being so lucid precludes the necessity of an engraving. The view of the exterior of the Capitol is also very fine. Those who have tried, know how difficult it is to photograph, but Mr. Walker seems to have overcome all trouble, and succeeded admirably. This picture, which is about 12×15 inches, was made with a 12 inch globe lens, $\frac{1}{4}$ inch stop. Exposure 45 seconds. It is the finest picture we have yet seen of the Capitol building, the only one to be bought being a copy of the architectural drawing, we believe. Our only regret is,

that being in the employ of the Government, he is not permitted to sell prints from his negatives. We trust others will go and secure negatives, so that all who desire prints may be gratified.

SOLAR CAMERAS WITHOUT A REFLECTOR.

I HAVE noticed for some months past that there has been much discussion as to who was the real "inventor" of the solar camera

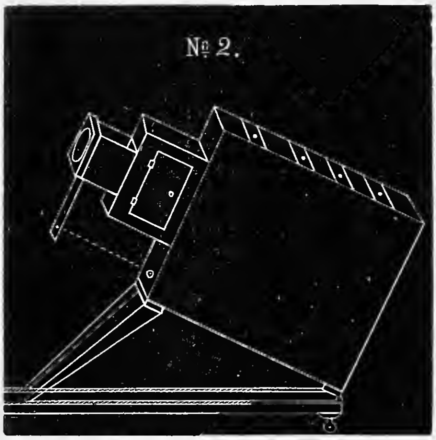


without a reflector. One manufacturer seems to be the chief claimant, and, by "special notices" and private letters to those using non-reflecting solar cameras *not made by him*, announces that all such are "infringers," and will be "prosecuted according to law," and has, in fact, endeavored in *several* ways to intimidate photographers and to prevent them from using any other apparatus than his own.

Now, without attempting to discuss the claims of this individual, I will merely state for the benefit of the fraternity a correct account of my experience with the solar camera without a reflector. If anybody used it before I did, all right. I do not claim its invention, but the dates I am able to give seem to throw us into the dark as to *who is the inventor*. I fear that will be a difficult job to prove.

The first apparatus I constructed of this kind was at Columbus, Ohio, in 1857, but did not use it to print chemically until May, 1858. Being a portrait-painter, I used it previous to this for sketching on canvas. At this time I made several collodion pictures on glass, some of which I used as transparencies. Some I backed with white paint, and others with cardboard, plaster, and tinted paper. At the same time I conceived the idea of using clockwork to carry it with the sun; this I carried into effect in the spring of 1859. I did not, however, use this instrument as it was burned, together with my gallery. In December, 1859, I constructed another, which I used successfully in printing both on paper and canvas, large and small; this was used on the public street, and exhibited and explained to all who had curiosity enough to notice it, in Marysville, Union County, Ohio. In 1861, I used the same instrument (which was capable of printing on canvas 25×30 inches) in Delaware, Delaware County, Ohio, where I had it examined by an optician, who was desirous of making one for his own use. He, of course, can testify to the facts in the case. I cannot say now whether at that time I was using a single lens or a portrait tube, as I used both at different times with good results. My condensing lens was small, but sufficient to illuminate a quarter plate. This instrument is still in existence. I constructed another, in 1861, in the town of Morrow, Ohio, where I used it several months for pictures; this one, I think, is also in existence. I constructed still another at Memphis, Tenn., which I used a short time there. I removed it to Vincennes, Ind., where I used it for some time, and sold it to one D. W. Gaskill, and he in a short time sold it to some one who removed the lenses, and left the box, to which I have fitted other lenses, and am now using it in my gallery. It is quite a rustic concern, yet it answers the purpose well. Those various instruments, although upon the same principle, were differently constructed. The first, second, and third were arranged to focus, or set the canvas for different sizes, by sliding the focussing-board inside the box, very similar to the one more recently arranged by Mr. Shives. Another was on the principle of the bellows camera-box; and still another with several doors at different distances from the lens, to suit the various sizes of pictures. I also

arranged them differently for setting the final sharp focus, and the size of the condensed light. In one I set the negative stationary, and the magnifying and condensing lenses were movable, to set the proper focus and area of light required to suit the size of the negative used, or strength of light required. Another was arranged with the lenses stationary and the negative to move. But what I consider the best, and which was my first plan, is to give the negative full play between the lenses, also to set the magnifying lens the same as a portrait tube. I inclose some drawings, which will give you a better idea of the form and manner of handling the instrument. Two of them



were hinged on a pedestal near the centre with a quadrant working through, cogged on the lower edge, which fits to the worm of a screw, by which the instrument was elevated more or less to follow the sun; others, for the convenience of the arrangement, I have elevated, as represented by No. 1. A slip of wood with a small hole in the end, projecting from the upper end of the box near the condensing lens, served to show the proper position to the sun, by the sunlight through the hole falling within a given circle, as the dotted line on No. 2. This I conclude will, if you have the patience to follow me through, give you an idea of my solar instrument. Hoping you will bear with my tedious description, I will close this subject.

Truthfully, yours,

A. J. Savage,

Vincennes, Ind.

A THEORY OF PHOTOGRAPHY.

BY M. CAREY LEA.

I have, for a long time past, been engaged in an earnest effort to do what I could towards placing the theory of photography upon a definite and stable basis, and the result of my experiments I have, to a considerable extent, placed before the public. A few material ones remain to be described, but my principal object at present is to show that all these results can be grouped into a harmonious whole, and what will perhaps tend to render this view of theoretical photography acceptable is that it, to a great extent, reconciles the various views entertained by the most thoughtful photographers of the day, and shows that they are only apparently and not really incompatible with each other; that in fact it only requires a few generalizations to prove that the differences of opinion depend, to a large extent, upon differences of condition; that behind these stand general principles upon which all can unite without the abandonment (except in one or two instances) of opinions at present entertained.

The theory which I propose may be summed up in the following propositions:

1. Pure iodide of silver is always sensitive to light.
2. When isolated, it is never decomposed by light, but undergoes a merely physical or molecular change.
3. But when exposed in the presence of free nitrate of silver, it undergoes with time a distinct and abundant reduction.
4. This reduction is to a sub-iodide, and not, as supposed by some, to metallic silver.

From these propositions there result the following important corollaries:

1. The image on pure iodide of silver, isolated, is *single.*
2. That on iodide of silver moistened with solution of nitrate of silver may be, and probably, generally is, *double.* That is, it consists of a physical image impressed upon particles of iodide, and they may also be a reduced image due to the nitrate of silver.
3. Where an organic film is present, containing the iodide, and the whole is moistened with nitrate of silver, the image may be *triple;* it may consist of the two former

with the addition of a third due to the organic matter, as exemplified in my experiments of removal of the iodide by solvents, and production of a picture, independently of the iodide.

It also results from the foregoing that the physical theory is pre-eminently the true one, because those holding that opinion have never denied that the silver haloids were, under favorable circumstances, reducible by light, and our view that a developable image may be produced, independently of any reduction or decomposition, is one that has been placed beyond controversy.

I now proceed to the proofs of the foregoing propositions. Part rests upon experiments already published; those I shall simply refer to. Part upon new experiments, which I shall state a little more fully.

The *first* of my propositions is, I believe, now generally admitted. The *second*, that no reduction accompanies the production of the latent image upon pure iodide of silver, is demonstrable in several ways. First, by experiments already published, in which it was shown that exposed plates recovered their sensitiveness by *simple repose in the dark*. This position is also strengthened by the following experiment, not hitherto published.

Iodide of silver was precipitated with *perfectly pure* iodide of ammonium, so that it was perfectly free from chloride or bromide, a fact which was ascertained with the utmost care. Nitrate of silver was present in excess, after which the precipitate was carefully washed, and then allowed to stand under liquid ammonia for some days in the dark. The ammonia was then washed thoroughly out, and with it any possible traces of bromide or chloride, and the iodide was placed at a southern window. It rapidly darkened to a grayish color; this darkening reached to only a pale grayish shade, and then stopped entirely, nor did any amount of exposure increase it. The vessel was left in the bright light and occasional sun for the whole day, with frequent stirring to bring up new portions to the light. It was kept moist during the whole exposure.

The water was poured off and replaced by nitric acid, in contact with which it was left for a day or two. By this treatment it perfectly recovered its lemon yellow shade. But the nitric acid had taken up no silver; not a trace could be detected in it. This is very significant for two reasons. First, because, as I have lately shown, even very weak nitric acid entirely destroys a latent image; and second, in that I have also shown that when sub-iodide of silver is treated with nitric acid, it is resolved into metallic silver, which dissolves, and neutral iodide, which remains; a further confirmation of which will be found further on. It therefore follows that no reduction (even to sub-iodide) took place when the iodide was exposed to the light, or else silver would have been dissolved out by the nitric acid, and would have been detected in it.

I now pass to the next experiment, which was directed to the ascertaining decisively that reduction took place when pure iodide of silver was exposed to light in the presence of free nitrate of silver.

A portion of the same perfectly pure iodide was placed in a porcelain basin, and covered with a solution of nitrate. It was exposed beside the other for the same period of time. It darkened a good deal, assuming a greenish gray color, but without any approach to black, or indeed any great depth of tone. It was frequently agitated and stirred. Finally, it was well washed, to remove all the soluble silver salt. It was next left standing for thirty-six hours under a strong solution of hyposulphite of soda, to remove all undecomposed iodide. A grayish powder remained, and it is worthy of observation that this powder was much lighter in color than before treatment with the hyposulphite, so that the darkening seemed rather to depend upon a change of color in the undecomposed iodide than upon the reduction.

The next step was to decide what was the nature of the substance which resisted the action of the hyposulphite. Was it metallic silver or sub-iodide? When sub-iodide is treated with nitric acid, as before mentioned, it does not dissolve entirely, as silver does, but leaves a residue of bright yellow iodide, very different in appearance and less in bulk than the original substance before

the action of the nitric acid. In the present case, this yellow residue was left, showing clearly that the reduction which had taken place *was to sub-iodide*, and not to metallic silver.

Any one who considers these results in juxtaposition with each other, cannot fail, I think, to perceive that although the action of simple nitrate of silver is not to be confounded with that of a developer, yet there is not wanting a certain amount of analogy. Iodide of silver, isolated, receives only a physical impression; but if free nitrate of silver be present, the physically impressed iodide has the faculty of attracting to itself silver, and sharing with it its iodine.

Whether any, and if so, how much of this action takes place in the camera, it is very difficult, perhaps impossible, to say. Iodide of silver by itself is fully capable of forming a developable image, purely physical, but it is certainly possible that that latent physical image may, when nitrate of silver is present, instantly react upon it with production of sub-iodide.

I conclude, therefore, and this view, I believe, has never before been suggested, that a physical image is first produced by the action of light; that when the iodide is pure, *the action stops there*, but that when free nitrate of silver is present, the latent image formed by the light (and not the light itself directly) *reacts upon the nitrate of silver*, so that each atom of neutral iodide acted upon, gives rise to the formation of two atoms of sub-iodide.

And I add this further suggestion, which is also new, and which I also believe to be probable, that even where this reduction takes place, it is probably not the fact of reduction that gives the power of development, but a molecular influence, a physical impression of light, upon the sub-iodide. In other words, it seems to me exceedingly probable that a plate of sub-iodide of silver prepared in the dark, and exposed in the camera, *would prove sensitive to light*. According to the reduction or chemical theory, this would be impossible; such a plate would fog all over.

Whether or not this last suggestion be true, I have had no time to verify; and even were it not so, it would be no objection to the general view here expressed.

THE REVENUE TAX UPON PHOTOGRAPHS.

Although the Committee of Ways and Means have not reported as favorably as we desired, and as we believed they would, upon our project, we have no great cause to be discouraged. There is still much work to be done, and the matter is in the hands of those who know no such word as *fail*. No one is more earnest in this matter than Mr. G. H. Loomis, of Boston. We shall hereafter take occasion to remind our readers of all he has done for them. In the meantime we append a copy of an appeal sent to every Congressman by his instrumentality.

"THE AMENDED REVENUE BILL, PHOTOGRAPHICALLY EXAMINED.

"To the Honorable Senate and House of Representatives:

"The Photographers of the United States have memorialized Congress through the Committee of Ways and Means, for a repeal of so much of the existing revenue law, as requires stamps to be affixed to their pictures, and instead to pay an *ad valorem* tax. Their reasons for asking this change are briefly these:

"The use of *stamps*, and the *inky* substance employed in cancelling the same according to law, is a source of serious damage to photographs, as, under the most careful handling, they become discolored and defaced by contact with each other; so much so, as to render them unacceptable and worthless, often making it necessary for the artist to reproduce them, or incur the displeasure, and consequent loss of his patrons.

"Secondly, as the stamps and cancelling cannot be applied until the pictures are called for and accepted, it is a source of great annoyance and inconvenience to the waiting customer, for the artist to '*lick, stick and cancel*' these stamps, to say nothing of the constant liability to damage, resulting from the causes above named.

"Presuming that these (and there are many other) reasons why the use of stamps should be abolished, what objection can be urged against the substitution of an *ad valorem tax* on sales, as required of manufacturers in other departments of trade and industry?

"The manufacturer of pins is not required to stamp each paper or package, and a paper collar is not stamped, as it would somewhat injure its appearance; and even the manufacturer of playing cards is required only to stamp the wrapper, instead of each separate card in the pack. Pray, does not the photographic art, as one of ornament and utility, demand from the Government as much consideration and protection, in this respect, as the interests we have referred to? Why, indeed, is any special pleading requisite and necessary to convince your honorable body of the reasonableness and justice of our petition, unless, perchance, it may be necessary to defend the profession from the suspicion of *dishonorable and fraudulent intentions*, not applicable to others named in the Revenue Bill.

"The Committee of Ways and Means, in response to our memorial, have reported as follows:

"'*Photographs, or any other sun pictures, being copies of engravings or works of art, when the same are sold by the producer at wholesale at a price not exceeding ten cents each, or are used for the illustration of books, or on photographs so small in size that a stamp cannot be affixed*, 6 *per cent. Exempt.*'

"Thus it will be seen, that what has heretofore been taxed 6 per centum *ad valorem*, and on which *no stamps* have been required, is now placed in the exemption, or free list. This perhaps is the result of good intentions of the committee, but it affords no aid and comfort to ninety-nine in a hundred photographers, as only that proportion of them are engaged in making photographs, or such pictures as are above specified, which retail, or even wholesale, for a price, '*not exceeding ten cents.*' To the larger and more permanent class of artists, and we may add *the* class which bears the principal burden of taxation, the action of the committee is a positive injury, as it gives to the migratory artist the privilege of hauling his Horse-power Saloon and Portable Skylight, up in front of the located manufacturer and dealer, where and when to make pictures '*inconveniently small*' on which to affix stamps, and '*conveniently small*' to avoid taxation or responsibility, in any other way.

"In conclusion, your petitioners would say, that they have no wish to prejudice their cause by asking for entire exemption from taxation, though it has been and may be shown, by facts and figures, that they deserve such a consideration, being already severely taxed on the material used in manufacture, but we do earnestly appeal to your honorable body to relieve us and our productions from *stamp duty*, and substitute as light an *ad valorem tax* on our sales monthly, as the necessities of the Government will allow.

"All of which is respectfully submitted.

Signed by

"G. H. LOOMIS,

"In behalf of the petitioners."

Now, to our readers all we have to add is this. If you would not have this project to fail, you must make some personal effort in its behalf. You are acquainted with your district Congressman. Send him a copy of the main points of this appeal, and get him to promise you to do all he can *for you*. We have done so in several cases, and have received replies from every one, and all seem willing to act for us, and help us.

THEN AND NOW.

TO THE EDITOR OF THE
PHILADELPHIA PHOTOGRAPHER.

HEARING it authoritatively stated recently, that there are fully fifteen thousand regular Photograph and Daguerreotype establishments, and an indefinite number of amateur operators in sun-painting in the United States, reminded me of a circumstance that seems ridiculous, when narrated in the light of 1866, but which is none the less true. In the spring of 1842, your correspondent, who was then a very young man, and on the look out for some business opening, was smitten with a fancy for daguerreotyping, an art which was then just beginning to attract popular attention. I had an acquaintance who was interested in almost the only, if not *the* only "Daguerreotype saloon" in the city, and with him I had several consultations with a view to carrying out my idea of becoming a disciple of Monsieur Daguerre. My artistic friend was amiable to a certain extent; he was

willing to furnish me on satisfactory terms with materials for my proposed new profession; he would have me taught the mystery and practice of the art on equally satisfactory terms, and all was going on swimmingly, when he made a condition which he insisted should be imperative, and which proved to be the rock upon which our bargain split and went to pieces. *This condition was, that I should not practise the art in Philadelphia. I might take my camera, my plates, and my mercury bath to towns in the interior of the State; but I must give Philadelphia a wide berth, for the reason, as my daguerreotypic friend declared, that there was not business in the city for another "saloon," and he did not want to injure his own business.* I was unwilling to leave the city, which was my home, and I was strengthened in my determination to throw up the bargain by the advice of a judicious friend, who expressed his confident belief that in the course of a few months all the people who wanted daguerreotypes would be supplied, and then the trade would die out!

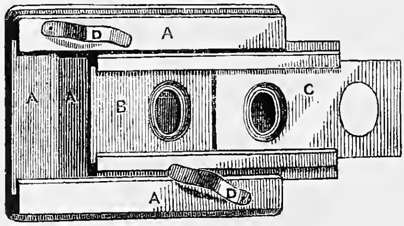
These are sober facts, strangely as they may read at the present day. This experience is almost a match for that of the brother of Benjamin Franklin, whose mother endeavored to dissuade him from starting a newspaper, as there was already one weekly paper published in Massachusetts, and another journal would never be needed.

C. S., Jr.

Improved Arrangement for Printing Vignettes.

All photographers have experienced some difficulty in printing nicely shaded vignettes. Either the shading is too decided and dark, irregular in shape, or too great, or too little. All these difficulties may be overcome by the simple arrangement described below, and to make it still more plain, we have had a diagram made, showing exactly the plan of it.

A A is a wooden pressure printing-frame, made in the usual way. To it are fastened the strips of thin wood, A and A, in such a way as to project a little inwardly, and form a slide or groove. In this groove another thin piece of board, B, is made to slide, and in it oval holes are cut of the size desired, and flared about one-fourth of



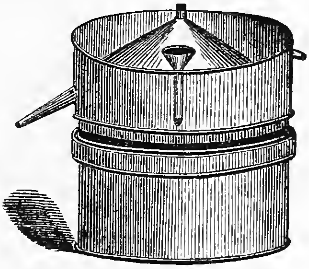
an inch all around. On this, strips of thin board are also tacked, forming another groove to fit the cardboard, C, which is also furnished with openings to correspond with those in the board, B, as to distance apart, but larger than the openings in B, and over these openings tissue paper is pasted in order to secure softer prints.

The reader will readily see how this is worked. The negative and paper are placed in the printing-frame, A A, as usual. The slide, B, is then inserted, fixed in proper place over the negative, and fastened by the springs, D and D. The slide, C, is then placed in proper position, furnished as above with tissue paper, and the whole is exposed to the light. The tissue paper may be one, two, or more thicknesses, according to the strength of the negative. The openings in B and C may be of any required size, and such slides can be readily and quickly made out of back-board used for frames, of ordinary thick cardboard. The larger the opening, the more indicated the print will be, and *vice versa.*

The slides, B and C, must be narrower than the grooves in which they work, so they may be moved up or down to suit the figures on different negatives. They may also be in two parts instead of one, in order that they may be more easily adjusted to suit the negative; but this is unimportant.

Any photographer can apply this improvement to his own printing-frames in a very little while. We are indebted for the model used to make our drawing from, to Mr. J. Stehman, photographer, Lancaster, Pa. The model was accompanied by some very beautiful prints made thereby, which speak very highly for its workings.

IMPROVED APPARATUS FOR DISTILLING WATER.



THERE is probably nothing more dependent upon cleanliness and careful manipulation than photography. To secure good results, the *utmost* cleanliness is necessary, and each chemical used should be of the purest and the best. Even the *water* used for the nitrate bath and silvering solution should be clean and pure. More troubles arise from the use of bad water than most photographers imagine, and the difficulty of obtaining pure or distilled water has made many an aspiring *confrère* despair of making first class work.

This need be no longer so. By the simple apparatus of which we present a figure above, the photographer may distil water in any quantity, and as he desires it for use.

It consists of a boiler, surmounted by a condenser, which supersedes the use of the old-fashioned worm, and for cheapness and economy in using, is deemed the best for the purpose.

Its construction is so simple that it involves no trouble or delay in its adjustment, and it may be used in connection with a stove, charcoal, or gas furnace.

The water to be distilled is placed in the boiler, and where the boiler and condenser are fitted together, there is a narrow space to be filled with water, for the purpose of forming a water joint between the two. The steam arises to the top of the cone-shaped condenser, and being condensed by the cold water poured upon the top through the funnel, trickles down the inside, is caught in a receptacle below, and flows into a bottle by means of the long nose at the side. As the cold water is frequently poured in through the funnel, the heated water rises and flows out through the short nose at the right of the still. (See cut.) The orifice at the top of the condenser must be kept tightly corked. Where ice is plentiful, it may be used on the top of the condenser which will obviate the trouble of continually changing the water. They are now ready for the market, we learn, and may be had of your stockdealer. They are made to distil one, three, or six gallons.

Portable Apparatus for Wet Plate Photography without a Dark Tent.

(Patented January 23, 1866.)

BY NELSON WRIGHT, NEW YORK CITY.

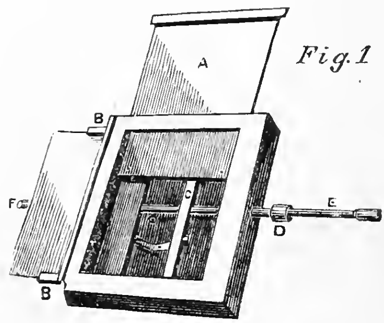


Fig. 1

OUR readers, who had a brief description of Mr. Wright's ingenious and useful invention in our last issue, will be glad to read a more definite one, and to examine the cuts accompanying it. As Mr. Wright no longer manufactures apparatus, we are at liberty to say that he will give any one the privilege of making one for their own use on very satisfactory terms. His address is 214 East 16th Street, New York.

The apparatus consists of four separate parts. The camera, which is of the ordinary construction. The plateholder, Fig. 1, of the usual size, but of a peculiar construction. The silver bath, same size and style as those in ordinary use. The developing tray, Fig. 2, of the same size as the silver bath. The above articles with a tripod stand, a box of clean plates, bottle of collodion, and iron developer, and either a cyanide or glycerine solution, comprise all that is necessary for a day's work in the field.

The camera being of the usual construction, needs no description.

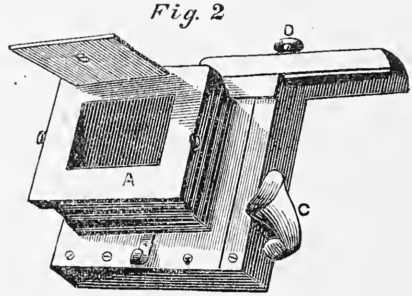
The holder, Fig. 1, is made of the ordinary size, and with the usual slide in front, A, but instead of containing the ordinary corners, has grooves upon the sides, and an aperture in the bottom; the back, or door, instead of being hinged, is constructed in a manner similar to a dry plateholder. There is a hard rubber carriage, B B, grooved to receive the plate, fitted accurately to the holder, open at the bottom, but connected at the top by a cross bar, C, to which cross bar, a hollow rod, D, is attached, passing through a light tight aperture in the top of the holder, and is prevented from sliding through by a knob at the top. Through the hollow rod runs a solid rod, E, at the lower end of which is a hook, and at the top a knob to prevent it from passing entirely through the hollow rod. The hollow rod is only long enough to allow the lower ends of the carriage, B B, to pass through the aperture in the holder, two inches, while the solid rod is of such a length that after it has passed down the hollow rod, the lower end, or hook, will be extended below the lower end of the carriage, B B, the width of the negative plate to be used less about half an inch. The solid rod being round can be easily turned, and the nose upon its lower end brought into any desired position.

The silver bath, is of the usual construction, but fitted with grooves upon the top, in which works the cover, which can be made watertight by turning a knob, and upon the bottom of the holder, Fig. 1, is a hard rubber face projecting at the sides, fitted accurately to the grooves upon the bath, and upon the developing tray, Fig. 2, and has, upon the end, a catch for the purpose of attaching it to the sliding covers of the silver bath and developing tray.

The mode of operating the holder and bath is as follows: The holder is laid upon its back upon the top of the camera with the ends of the carriage projecting from the bottom, the solid rod extending below with the hook turned out of the way. The plate is then coated with collodion, placed in the grooves of the carriage, the solid rod turned so as to bring the hook under it, and the whole drawn up into the holder by means of both rods. The holder is then attached to the sliding cover of the bath, and slid along the grooves on the top of the bath, pushing the bath cover before it, and, when directly over the opening in the bath, is stopped by means of a catch. By pushing both rods, the plate is lowered into the silver solution without any danger of making a line across the plate by stopping, and rests upon the hook at the end of the solid rod with its upper corners resting in the grooves in the lower end of the carriage. When excited, it is drawn up again into the carriage, and allowed to drain. The aperture at the bottom of the holder is then closed by pushing in the back of the holder, which action also presses the plate into focus against the edge of the carriage. The holder is then slid off the bath, drawing the sliding cover of the bath into its place, transferred to the camera, and exposed in the usual manner.

The developing tray, Fig. 2, is constructed with orange glass sides, double thickness, so as

Fig. 2



to be absolutely non-actinic, set in a wooden frame in the same manner as a bath, and one side is made so that it can be detached; to this side is attached a bellows like projection, A, closed at the top by a lid, B. The other side is closed by a door hinged at the bottom. This developing tray must be exactly the width of the plate used, and one inch deeper. In the lower corners of this tray are fastened two soft rubber corners, one inch high, so that from the top of the tray to the top of the corners is exactly the height of the plate used. At the lower right hand corner is a hard rubber funnel, C, for the purpose of introducing the iron solution into the bath. The top is provided with

a sliding watertight cover, exactly similar to that attached to the silver bath.

The mode of operating the developing tray is as follows: After exposure, the holder is taken from the camera, attached to the sliding cover of the tray, slid along the grooves, pushing the cover before it, and when exactly over the aperture, is stopped by a catch. The aperture at the bottom of the holder is then opened, and without lowering either carriage or solid rod, the latter is turned around so as to bring the hook at its end from under the negative plate which falls into the developing tray, upon the soft rubber corners at the bottom. The holder is then slid off, drawing into its place the sliding cover which is made watertight, by turning the knob, D. The position of the plate is then as follows: It rests with its two lower corners upon the soft rubber corners in the bottom of the developing tray; the back of it is against one side of the orange glass sides of the tray, and the top is against the top of the tray. The iron solution is then poured into the trough at the bottom of the tray formed by the two rubber corners, through the funnel, C. The tray is then turned down with a *quick* motion so that the solution may flow evenly over the plate, the door at the back thrown down, the door at the top, B, raised, and the action of the development can be as easily watched as in a dark tent, as all the light is reflected light coming through the lower orange glass side of the developing tray upon which the plate rests. As the plate exactly fills the tray, excepting the trough at the bottom, none of the developing solution can flow off from it. When developed, the iron solution is poured out through the funnel, water poured in, and the plate thoroughly washed, by rocking the tray from side to side; when washed, the water is poured out, the front, A, removed, the cover slid off, and the plate removed, ready for intensifying, fixing, or coating with glycerine.

It will be easily seen that in this apparatus there is no mixing of solutions, no part that touches the silver coming in contact with the iron, and after one plate has been exposed, the developing tray is the only part which requires cleaning, and as one side of it is removable, this is very easily accomplished.

This apparatus is very portable, one adapted for half size, with eighteen plates and the necessary chemicals, going easily into a small travelling bag, leaving room for sundry articles of clothing, and yet the bag measures only fourteen inches long, six inches wide, ten inches high.

This apparatus is the result of a long series of experiments instituted last spring, after the writer had become disgusted with the slowness of dry plates, and he has had two sizes, a 4-4 and a $\frac{1}{2}$ size, in constant use as an amateur since last summer, and has averaged, when using it, eleven negatives out of twelve cleaned plates. One great advantage he has found in using this apparatus is, that from the time the plate is coated with collodion, until the developer has flowed over it, it is not exposed to even the weakest light, a result which it is not possible to obtain in a dark tent.

The tripod stand used with this apparatus is in the form of a cane, $\frac{3}{4}$ in. in diameter, and although, when not in use, it is only the height of an ordinary cane, and exactly resembles it in appearance, it, when in use, can be made five feet high, and is perfectly steady. W.

LECTURE ON PHOTOGRAPHY.

BY COLEMAN SELLERS.

Second Lecture, continued.

In pouring collodion upon the glass plate, always look at the stream as it falls, never at the mouth of the bottle. Allow it to flow around the plate gradually. Hold the plate by the lower left hand corner, pour the collodion on to the upper right hand corner, allowing it to flow around the plate, and off at the lower right hand corner. Then turn the glass about, and move it backwards and forwards to allow the lines to coalesce so as to make an even film over the entire plate. If I held it still vertically while draining, there would be lines passing across the plate. After coating, cork up the bottle, and wait till the collodion has set, or till the impression of the finger upon it shows that it is partially hardened; it is then ready

to be placed upon a dipper, and passed into the bath, which must be done with a uniform motion. We now have the surface of the plate covered with collodion, which is the best possible substance for this purpose; there is nothing better. It will not dissolve in water; it is a solvent for the salts used to produce a sensitive film; it is a solvent for the iodide, and for the bromide, of ammonium. When the two together are placed in the bath, the film remains perfect, the double decomposition takes place over the entire surface, and through the whole thickness of this film, iodide and bromide of silver are forming. You saw how transparent it was, when I took it out; it will have changed entirely, and instead of being transparent, it will be quite opalescent; the surface will seem like pearl. Now, a film in this condition, when taken from the bath, has got the iodide of silver through its whole body, and also some free nitrate of silver from the bath. In a certain manner both are necessary; if I should wash off the free nitrate of silver, it would lose its sensibility which it has to have, in order to blacken, when exposed to light. Now, I said that the nitrate of silver would not blacken, when exposed to the sunlight. But if I dipped my hands in the solution, and then exposed them to the sunlight, they would blacken. It is not the nitrate of silver, but the organic matter on the hands that comes in combination with the nitrate of silver, which blackens. Now, the nitrate of silver plays an important part in this photographic process, and it is absolutely needed. The first plate I shall draw up, and expose to the action of the light in the room, to decide if there is enough actinism in these lights to interfere with my process. You see the thing is entirely changed; you should not hurry it, but should let it be there some time. The iodide of silver forms rapidly; the bromide of silver is slower in its production. If you should coat the plate with the bromide of ammonium only, it becomes bluish in fifteen minutes, showing that the bromide is slower than the iodide, and you do not get the full effect until it has remained there for some time. You should churn it up and down, and get the alcohol and ether from it. But if, when you look at it, you see oily lines, never take the plate out till the lines disappear, and there is one uniform film over it. In taking it out, there is one precaution to be observed, which is not noticed in the books. Those of you who have attended Prof. Morton's lectures, and have heard him describe the attraction of cohesion, know that if I draw this up quickly, I would bring with it a large amount of fluid. If I draw it very slowly up out of the bath, it gives the fluid time to settle from the plate, so that when we have drawn it quite up to the top, there is but little fluid left. Now I will put it in again, and draw it up very violently, and show you the difference. You see the fluid runs off in a stream, and you would have to hold it, and let it drain longer than if you drained it by drawing it out gradually. On putting it in, you must also use a uniform motion, otherwise there will be a line on the plate. This first plate I intend to expose to the light of the room, and throw the developer over it. The developer in this case is a solution of the protosulphate of iron, or common green vitriol, in water, of the strength of two ounces of this salt to the quart of water. You dissolve it, and then filter it so as to have a clear solution. To it is added a certain quantity of acetic acid No. 8. The acid is numbered according to the number of ounces of water to the ounce of acid required to produce vinegar. The acid is a retarding agent, and if I should throw the iron over the plate only, the action would be too violent.

Now, I do not want to say anything of the theory of development, because very few people really know anything about it. I pour over this plate some of the iron solution. The plate is blackened. This shows the light in the room is a great deal too strong to expose it to with impunity, and that when I attempt to make the picture, it would be necessary to have the lights turned down. Still I had them high, that you might see the appearance of the plate. You notice the white surface is all gone; it is covered with a deposit of metallic silver over the whole surface.

I will now prepare another plate, and proceed to make a photograph from this little statuette. Now, *observe* the pouring.

You hold the plate by the lower left hand corner; never look at the bottle, but at the pool upon the plate. Let it pass around towards the thumb, not touching it, however, then slowly down to the bottle, and it will be enough; tilt it up till you have it down to the corners, and see that you have an even film. Wave it backwards and forwards, so that the lines coalesce and run together, and you will have a uniform film over the surface of the glass. Wipe off the collodion which comes over the edges of it till it is sufficiently *set*, and immerse it in the bath as soon as the fluid has ceased to flow, which can be told by the touch of the finger in one corner. Then, placing it on the dipper, lower it slowly into the bath. Now, while it is in there, we will see if we can get an image of this little statuette. I have here a lantern, an ordinary tin affair, in which three strands of magnesium wire are hanging. When we have prepared the plate, we will allow the light to shine on the little statuette. Now, I want to say that this lens has been corrected, so that the chemical and visual focus fall upon the same plane. Within this camera we have a sheet of ground glass upon which an image is formed. When we sufficiently illuminate the object, it seems quite sharp; we have an image formed in this box now. I have a holder in which I will place the sensitized plate; this holder is made with glass corners, so that the plate will not come in contact with any wood. And I would here observe that the plateholder should never be exposed while it is wet to ordinary daylight, because the fluid becomes acted upon, and will often flow back over the plate, and produce a disagreeable stain.

Now, we have shut up in this box a sensitized plate which we might safely carry through the open light. We now remove the ground glass from this box, put in its place this holder containing the plate, and then carefully draw up the slide. There is not sufficient light to allow the picture to be made, so we must add a light. I will add the magnesium light, and allow it to burn as long as it will. I move it about so as to have it appear more like diffused daylight. Now, probably, it is impressed enough on one side; on the other side there are deep shades. To obviate that difficulty, I will now ignite and burn one single strand on the other, and expose it for a little time, to take off the harshness of the shadows, and I will see what we have accomplished by this operation. The slide is now put back in the holder, and the plate removed. We have no visible image upon the surface of this plate at all. You see the plate is even white, and there is no apparent effect. I will lay it upon a sheet of yellow glass, and put it behind the burner, and thus allow you all to see it. You see no image there of the statuette. We now pour some developer over the surface of it, and the image will appear very rapidly. You will probably all see the figure as it appears upon the plate. I now wash it to prevent any further action, and remove all the developer and the remaining silver. The plate in this stage should be washed a good deal; it ought to be under a tap of the ordinary hydrant for two or three minutes. I do not want to detain you so long, and shall now show it to you again. (Applause.) In this condition we have the photograph formed of metal silver, and it is surrounded by simple unreduced iodide of silver, and is not in the best possible condition for printing. We want to remove this unreduced iodide of silver. Now, iodide of silver is soluble in various substances. The hyposulphite of soda is used, and is abbreviated into the word "hypo." If I should pour the solution of hyposulphite of soda into this solution (pointing to a large glass containing iodide of silver), all the iodide would be dissolved, and become a clear liquid again. Now, I pour this solution into a little porcelain dish; it makes very little difference about the quantity of the hyposulphite we use, but usually about five ounces is used to the pint of water. There are other things which may be used to dissolve the unreduced iodide of silver as well as the hyposulphite of soda, which are in fact better than it. One of these is the cyanide of potassium. An objection to the cyanide is, that it is a violent poison, and the fumes of prussic acid that pass from it, are said to be injurious to the health. This substance is used by many in preference to the hyposulphite, but it acts so vio-

lently upon the unreduced iodide that it will clear the plate almost instantly, and leave a very bright and pretty image. We also make use of cyanide to remove the stains from the fingers. The whole of the operation is apt to dirty the hands.

At this time I must give you one precaution,—the whole success of photography depends upon absolute cleanliness, which means never mix things which ought not to be mixed, for you must not make a mess of the materials which you are using. You can tell when the plate becomes clear by the white appearance. When that is all gone, it presents a uniform appearance. We have succeeded in making a very good negative, quite as good as we might have made in broad daylight. After it comes from the hyposulphite, I will show you the appearance of it. (Applause.) The next operation will be to wash off the hyposulphite of soda, or to wash off the hypo. If we should allow it to remain, it would crystallize over the surface, and break it up, and it would be deleterious to the negative. Many of the early negatives were not washed enough, and have turned yellow from this cause. You will see the necessity of the great amount of washing. In this operation I would observe that there are ten things to be carefully attended to. First, clean the glass plate; next, flow the collodion; next, immerse the plate in the bath; then put the plate into the plate-holder; place it in the camera; sixth, remove the plate from the holder to the dark-room; develop, then wash and fix; and finally, wash and dry.

I read these to you just as I observed in a letter published in *The Philadelphia Photographer*, in which I said, in making the negative there are ten processes; so, to prevent mistakes, I would advise you all to make a copy of it, and paste it up in your rooms, and refer to each step of the proceeding, till you are familiar with it.

(To be continued.)

AMERICAN CAMERAS.

It has long been a matter of pride with us to know that notwithstanding the many excellent cameras made abroad, each one having its peculiar merits, those the most in favor for many purposes are of home manufacture.

We do not know when we have felt this pride more deeply than when testing the merits of the excellent cameras made by Messrs. Willard & Co., New York, under the care of the justly celebrated optician, Mr. Charles F. Usener.

We have been making experiments with the half, whole, extra whole, and double whole sizes, and removed the focussing cloth from our head perfectly delighted. Being of longer focus than most lenses, they possess the great merit of cutting a standing figure equally sharp all over, from head to foot. So difficult has it been to do this with other lenses heretofore, that most operators have been habitually refusing to take standing figures, except in cases where they were pressed to do so. In the country we are told that over three-fourths of the subjects who want pictures desire to be taken standing, but cannot be gratified, because the operator's lens will not cut the figure sharp and free from distortion. Such desires can now be gratified, as in this particular the Willard cameras are absolutely perfect.

We tested them severely, and in no instance failed to get head and feet equally sharp. With the extra whole size tube we secured some excellent negatives for vignettes, quite equal to anything we have ever seen.

We have not tried these lenses for out-of-door work, but are informed that their performances in that line are equally satisfactory. Their focal length peculiarly adapts them for stereoscopic work where boldness and definition are the requirements.

Possessing the valuable properties these lenses do over so many others offered for sale, though our experiments were not comparative, we do not hesitate to say that they will become more and more popular as they are tried, and they deserve the best of patronage by American photographers.

We are doing but simple justice to the craft to say this much in feeble testimony of the gratification we experienced in trying the new American cameras made by Messrs. Willard & Co.

RETOUCHING THE NEGATIVE.*

[The Phot. Correspondenz lately published a very beautiful portrait from a *retouched negative* executed by Rabending, of Vienna. No explanation was given as to how such effects were produced. The following slightly abbreviated remarks by Grasshof are believed by the editor of the Mittheilungen to convey at least a part of Rabending's method.]

The following method of retouching the negative is of particular use in removing the effect of freckles and of analogous yellow or brown spots which come out too dark in the print, and are ruinous to the effect of the complexion. This is accomplished by the application of a *common soft lead pencil* (Faber No. 1), by simply applying it upon the varnished plate.

For parts that require to be brought up very strongly, for example, in enlargement from paper positives in which the grain of the paper shows very badly, a black oil-crayon ("creta polycolor") is to be preferred. This is especially useful in bringing up the dark parts under the eyes, &c., which mark themselves too black in the print.

The best light to work by is that of a lamp with a ground shade. A sheet of bent paper is placed around it as a screen and a hole of 1½ or 2 inches square cut in the paper. The negative is so fastened that the part worked upon receives the light through this hole.

In working by daylight, set a piece of ground glass in front of the negative, and a piece of pasteboard with a suitable hole cut through it, behind it. Set this up at the window, and allow the light to pass only though the part worked at.

The lead of the pencil or the chalk hold sufficiently well to the varnish, and do not come off upon the print.

Points and holes are, however, best filled up with India-ink.

A certain dexterity is necessary, but is easily acquired, more easily than with color and brush. It is to be observed that places already touched with pencil, will not take the chalk. Such, if needing deepening, must be washed with India-ink.

* Translated from the Mittheilungen of Berlin, for *The Philadelphia Photographer*.

THE OPAL FERROTYPE.

BY V. M. GRISWOLD.

EDITOR PHILADELPHIA PHOTOGRAPHER.

DEAR SIR: I had not expected to bore you or your readers with anything further about the "Opal Ferrotype" process, but the second article from Mr. Wenderoth in your May number seems to me to justify a rejoinder, which, so far as I am concerned, shall be final upon this subject.

Mine is an exceedingly simple process, and it is not very ingenious or fair, to guess at what a thing or compound may be, and then seek to annul its prospects for usefulness.

This is precisely the method adopted by Mr. Wenderoth. He has since had some of my film, which was sent to you more for the purpose of upsetting the chalk theory than anything else. The solution being a year or more old, was not, certainly, in the best condition for taking pictures; but I am, nevertheless, printing upon the same film nearly every day successfully.

After abundant time has been given to examine the opal solution, he again guesses that it contains some resinous or other gum, and asserts that gum sandarac introduced into a collodion film with a certain amount of water and some chlorides, furnishes a film upon which pictures may be taken. Fortunately, he does not say what kind of pictures. Now, where a collodion film in which resinous gum is dissolved, depends either for its whiteness, tenacity, porosity, or other essential quality, upon the introduction of water, either in large or small quantities, no respectable picture can be made, for it is essential that the very purest alcohol and ether alone should be used, and only such chlorides as are soluble in these mediums, or with the very smallest addition of water, where such solution cannot be effected without it.

Mr. Wenderoth says, he has found (?) the use of resinous gums in collodion for the production of positives "impossible," because of the difficulty of removing the unreduced silver salt. Now, I assert that it is not only possible, but that films containing resinous gums, may be rendered as permanent, if not more so than prints upon albu-

men paper. Not, of course, by the same manipulation. And furthermore, notwithstanding the terrible condition in which he states he saw the specimens which were exhibited to your Society, there is not so much difficulty in removing the unreduced silver salt from my film as from albumen. Further, I assert that the real difficulties in the way of the success of the Opal Ferrotype lie in a direction which Mr. Wenderoth has not yet even guessed at, and which are in a fair way to be overcome.

The pictures will stand an amount of heat greater than will ever be applied to them after finishing, unless purposely applied to destroy them, and I have only recommended the avoidance of much heat, because when applied, the enamel is liable to dry uneven, as also to penetrate the white film, rendering it transparent, and converting the picture into a negative upon a black ground, instead of a positive upon a white ground.

As to the theory that contact with ether, alcohol, &c. &c., affects them injuriously, or destroys them utterly, I will only remark, that every bath to which they are subjected, from the silver bath to the fixing bath, is highly charged, sometimes to the extent of one half the bulk of solution, with the strongest alcohol. Furthermore, I have yet to see a photographic impression by whatever process, which could not be destroyed by some agency, if an ingenious individual would devote his time and energies to that express purpose.

Neither are the "turning brown," scaling, and cracking off, &c. &c., attributable to causes which Mr. Wenderoth surmises, but to very different causes, not insurmountable. Mr. Wenderoth again says, "Good positives cannot be produced, when the sensitive silver is mixed with the material that is the substance of the picture." We all know that this is not true. The collodio-chloride, the albumen, and other processes, refute the position, and my film is no more subject to objection on this account than any of these. Let Mr. Wenderoth sensitize a piece of albumen paper, expose it under a negative with its back instead of the albumen surface to the negative, and he will find that not only the albumen film but the paper itself is impregnated with the silver salt to an extent that it will give him a distinct impression upon the back of the paper.

There is no water introduced into the film, for the purpose of producing, or assisting in producing the white surface. It is religiously avoided, except when absolutely necessary as before indicated, and I can produce a more or less dense white, a more tough and tenacious, or a powdery film, without the use of water to the smallest extent.

But I am done forever, I hope, with Mr. Wenderoth's guessing line of argument. I have been drawn into this controversy against my will. I now peremptorily withdraw from it. It is worse than folly to argue with a man who reasons from the merest vague assumptions, and who forgets that many things which have heretofore been, theoretically, impossibilities, have now become practical facts. I have no quarrel with Mr. Wenderoth, and shall give proper weight to his opinions, when, in strict conformity to my formulas, he fairly tries my process. And he cannot justly praise or condemn it until he has done so. What he has done, or attempted to do himself, and failed in, has nothing to do with my failures or successes, and cannot properly be used as arguments for or against them, until he proves them to be identical.

I freely acknowledge that my process is full of faults and difficulties, like all new processes; but if this was a legitimate argument against its introduction, it might, with equal propriety, have been applied to every photograph process in existence; in which case the art would still be in its infancy. And because of these very difficulties and imperfections I have been slow to give my material to the public until every difficulty that has arisen in my practice had been, so far as in my power to accomplish it, removed.

We trust this subject has now been sufficiently ventilated, and it *must* now cease, to give room to matters of more general interest and importance. Mr. Griswold is preparing his process for sale.

Our Picture this month was made by Messrs. Henszey, of 812 Arch Street.

PHOTOGRAPHIC SUMMARY.

BY M. CAREY LEA.

FRANCE.

*Photographic Varnish.**—M. Bussi has patented the following application to photographic positives, with a view to their preservation.

He first prepares a solution of gum arabic, white and clean, in four times its weight of water, of which he applies a thin coat to the print, and then coats with plain collodion, as follows:

Alcohol,	6 ounces.
Ether,	5 "
Pyroxyline,	144 grains.

Bull. Soc. Chimique.

Enamels.—In the Photog. Correspondenz is a translation of Joubert's process, as follows: Take

Sat. solution bichromate of amm.,	5 parts.
Albumen,	3 "
Honey,	3 "

And dilute with 20 to 30 parts water.

Pour this over the glass plate, selecting only perfect plates, dry and expose under a positive, preferably a glass positive. If a paper print be used, wax it.

The exposure lasts generally a few seconds only. Then dust over it with a fine brush some enamel color until a fine positive appears. Fix with alcohol to which a little nitric or acetic acid has been added, by pouring over.

When the alcohol is dry, place in water to wash away the salts, dry, and burn in an enamelling muffle.

GERMANY.

Sympathetic Prints.—Considerable interest has been exerted by the exhibition of the following photographic puzzle: A piece of white albumenized paper, and another of blotting-paper are shown. Neither have any trace of a picture upon them, and both may be exposed to light or the sun without injury to the subsequent result. The blotting-paper is laid on the albumenized and moistened with water, whereupon a distinct picture, full of detail, starts out upon the albumen surface.

* Precisely same process as that on page 145, *Philadelphia Photographer.*

The explanation given is as follows. A positive printed in the ordinary way, is thrown into solution of corrosive sublimate until it disappears. This is the albumen sheet above spoken of. The blotting-paper is moistened with solution of hyposulphite, and dried. When the hypo comes in contact with the concealed picture, it leads to the formation of metallic sulphides of a brown tone, which form the picture.

Photog. Mittheil.

(Probably the paper prints should be fixed without gold toning.)

The Mittheilungen comes in a new and improved form, such as gives evidence of success and vitality in that well-edited periodical.

Focussing Screens.—Frick replaces ground glass with the following mixture. Scraped white wax is dissolved in 3 oz. ether to saturation. Add 60 to 70 grains finely powdered gum damar, and a teaspoonful of plain collodion. Pour on like collodion. With too little damar the film rubs off; with too much it becomes too transparent.

Phot. Corresp.

Negatives for Enlargement.—The following advice is given by Van Monckhoven, in his new work, now in press.

The perfect transparency of the negative in the shadows is the first essential. The collodion, silver bath and developer may be any that give good results in ordinary working.

The sensitized plate should be exposed in the camera a little longer than usual. The object of this is evident Were the plate given the usual exposure, the developer would bring out the details to the shadows only after a considerable time (nach längerer Zeit), during which time the high lights could become too dense. But by the longer exposure, the details in the lights and shadows are got at once. Therefore, in developing, the operator provides two vessels, one containing a sufficient quantity of iron developer, and the other a supply of water. The iron solution is so poured on as to wash off the bath solution. In a word, the author remarks, I shall best express my idea, by saying that the plate is *washed with developer.* The picture appears, and the moment that the details appear on the shadows, the water is applied, and the plate is well washed, and fixed with cyanide of potassium.

The essential part of the operation consists in getting the developer off before any veiling takes place (five or six seconds are generally the time required), by means of an energetic stream of water, and the use of cyanide instead of hypo.

The dry negative examined by daylight, should show the details in the shadows as scarcely visible. The dense parts must be so thin that one can read through them, and see the smallest objects, otherwise the enlargement will not be satisfactory. What is most of all to be avoided is veiling; this is worse than too great density.

Negatives that are too strong are best reduced by plunging into a bath of one grain perchloride of iron to each three ounces of water. Then wash and dip in cyanide, and the strength of the negative will be found diminished; if not sufficiently, the treatment can be repeated; the length of immersion will vary from a few seconds to several minutes.

No sort of varnish, and not even gum water, is to be applied, both because the heat would cause these to ruin the picture, and because varnish destroys some of the fineness of the image. *Phot. Corresp.*

ITALY.

Sulphocyanide of Ammonium. — Arneris states that after experiencing much trouble from loss of strength in toning positives with this substance, he made particular experiments to ascertain the cause, and found that when paper was sensitized on a fifty-grain ammonio-nitrate bath, printed either in sun or shade, a little more deeply than the final shade wanted, and then toned in a *neutral gold bath* at least two days old, such prints did not suffer. Whereas, with an alkaline bath or a fresh neutral one, the decoloration always took place.

Camera Oscura.

Developers.—Coceo affirms that with nitrate of alumina in the developer, the exposure may be materially shortened. He directs to take

Protosulphate of iron,	5 oz.
Sulphate iron and ammonia,	750 grs.
Boracic acid,	½ oz.
Water,	16 "

Dissolve with a little heat.

Also take

Nitrate baryta,	1650 grs.
Alum,	4½ oz.

Dissolve in 16 oz. water, mix with the foregoing and boil a few minutes, place in 4 oz. vials, and seal up. Of this, 2, 3, or 4 parts are added to 20 of water for use, and constitute the developer. *Ibid.*

Landscape Photography. — Mr. Russell Manners Gordon mentions, in answer to inquiries, that in a certain picture of his in which reflections of trees on the other side of a stream were beautifully rendered, he had obtained this effect and avoided the glare of light by placing the camera on the ground. *Br. Journal.*

Mr. Gordon is one of the most successful landscapists of the day, and his suggestion is valuable. In one case he exhibited two pictures of the same river scene, one with the camera upon the tripod, and the other with it on the bank; the advantage was markedly in favor of the latter.

Preservation of Sensitive Paper.—Marowski recommends to preserve sensitive paper between sheets of waxed paper. Ernst, that prints which have a yellowish color in the whites can be cleared by plunging in an extremely weak bath of cyanide. Grüne confirms this; the bath should not be stronger than 1 grain to 4 ounces. Remelé remarks that Nauk's process of preserving sensitive paper in a chloride of calcium box, answers only with plain arrow-root paper, and is ineffectual with the albumenized. Vogel, that the purity of the atmosphere has much to do with the keeping properties, the presence of very little sulphuretted hydrogen acting very unfavorably. Kunstman, that floating too long on the silver bath (five minutes or more) tends to yellowness. Ernst, that papers themselves have much influence. Vogel, that a want of freshness in the albumen acts unfavorably, and that some English papers keep remarkably well when sensitized. Wenske, that paper sensitized on ammonio-nitrate bath had kept two weeks between yellow plates. Prumm recommends the addition of a few drops of nitric acid to the positive bath in hot weather. Vogel, that sensitized paper dried by heat turns yellow more easily, the silver salt altering the albumen.

Report of the Committee on the Schnitzer Lens.

APPOINTED BY THE PHILADELPHIA PHOTOGRAPHIC SOCIETY AT APRIL MEETING.

THE committee appointed at the April meeting of the Philadelphia Photographic Society to examine the properties of the new lens invented by Mr. Schnitzer, has the honor to submit the following report:

The committee has tested the lens for field work, for groups (in and out door), for portraiture, and for copying. The combination consists of a triple achromatic front lens, and a double back lens, similar in construction to the ordinary portrait combination, with two rotary diaphragms inserted, one of which contains the usual apertures, the other two dispersing lenses and one simple aperture, and it is by the adjustment of these inserted lenses that the several focal lengths are obtained, and the size of the image varied at the will of the operator.

Besides this advantage, Mr. Schnitzer claims for his lens,

1st. Quicker work than any other lens of equal aperture and definition.

2d. Great depth of focus.

3d. Excellence in portraiture, especially in groups.

4th. Correctness in copying.

1st. As to the first claim, quickness of action, we find it established. A satisfactory negative can be obtained in field work in from three to five seconds, using the 5-inch focus. In Mr. Wenderoth's gallery, on a dark day, a good negative of a group placed in a position very trying for the lens, was obtained in thirty seconds. The 6 and 8 inch foci, even when not stopped down, failed to produce good results without more prolonged exposure.

2d. As to the second claim, great depth of focus, we find it correct. The lens was tested by placing four figures at a distance of 27, 25, 23, and 20 feet from the camera; with an exposure of thirty seconds, a good negative was produced, sharp, and without unusual distortion. It was also tested by placing erect seven numbers of *The Philadelphia Photographer* on a table at a distance of 8, 9, 10, 11, 12, 14, and 16 feet from the camera. The lettering came out on each, clear and sharp. In this test, a comparison with other negatives taken with different lenses resulted in a decided advantage for the Schnitzer lens. The exposure, also, was much shorter.

3d. As to portraiture, we find it excellent. It was tested in the usual manner, and found to work as well as any lens used for comparison. In one respect it is remarkable, in freedom from distortion. Mr. Wright was posed, and the lens placed within three feet of him; a portrait was made in this very trying position in forty-three seconds without distortion.

4th. As to its correctness in copying, we do not find it at all equal to the globe, the lines, both vertical and horizontal, being slightly curved.

In the architectural view submitted, a slight curvature of the vertical lines is noticeable.

As to the essential peculiarity of the combination,—power of changing the focal length,—we find a slight inequality in the results obtained by the use of the different foci. The image is certainly enlarged by the use of the 6 and 8-inch foci, but the image produced (by the 8-inch especially) appears to want that crispness of definition so essential in a lens. A doubt exists in the minds of the committee as to the coincidence of the visual and actinic foci, in the 8-inch combination.

The committee, in conclusion, would report very favorably as to the value of the invention. The advantage of being able to enlarge or diminish the image at will, without change of base, is very great, and must recommend itself to every photographer. The mechanism by which the change is effected is as simple as ingenious, and the committee thinks Mr. Schnitzer merits the highest praise for the introduction of a new and valuable aid to the operator.

In examining the prints submitted, it should be borne in mind that Mr. Schnitzer only intends the instrument with which they were made for card work. In many instances a ½ plate has been covered.

HUGH DAVIDS,
Chairman.

JOHN C. BROWNE, ALEX. WILCOCKS,
F. A. WENDEROTH, W. F. NORRIS,
May 1, 1866. Committee.

PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

Proceedings at the Regular Stated Meeting, Wednesday Evening, May 2, 1866.

Coleman Sellers, President, in the chair.

The minutes of the last meeting were read, and, at the suggestion of Mr. Hurn, were amended and adopted.

Mr. Davids, chairman of the committee to report upon the Schnitzer Combination, read his report (page 187).

On motion, the report was accepted, and ordered to be entered on the minutes, and the committee discharged.

The resignation of Dr. Morgan, as phonographic reporter, was offered and accepted.

Dr. Wilcocks remarked that he had read with much interest in the April number of *The Photographer*, Mr. Lea's paper on the Spontaneous Sensitizing of Iodide of Silver.

It had occurred to him that it was in his power to repeat the experiments of Mr. Lea, modified so far as to substitute the processes ordinarily used by photographers for those described by Mr. Lea.

In November last, he had prepared a dozen of tannin plates, and placed them in a box made for dry plate operations by Messrs. F. W. & R. King, of Baltimore.

Of these plates he had exposed Nos. 1, 2, and 3, to landscapes. No. 4 was exposed on a dull day for fifteen minutes to an interior.

At the time of reading Mr. Lea's paper, none of these plates had been developed, and it occurred to Dr. Wilcocks that, admitting the justness of Mr. Lea's conclusions, the latent images made upon his tannin plates in November, must, by the month of April, have entirely lost their susceptibility of development. He accordingly applied pyrogallic acid and silver to the first three plates. No. 1 gave the faintest trace of the picture, the strongest part being a vertical line in the centre of the plate (stereoscopic) where the two pictures overlap.

Nos. 2 and 3 gave no trace whatever under the developer.

Negative results often prove very little, and the conclusions might be drawn in this case, either that the latent images had faded out, or that the plates were worthless.

Plate No. 4 served to settle the question. It had been exposed, in November, fifteen minutes, to an interior. It was placed by Dr. Wilcocks in the camera, again, in April, and exposed to a street view for two minutes, and immediately developed. The result was a strong image of the street view, but not a trace of the interior. The plate was shown to the Society.

Mr. Graff: I have kept dry plates three weeks after exposure, before developing them, yet the result was successful.

Mr. Borda: I have kept them a month after exposure, yet the development succeeded. I am of the opinion that two minutes to take a street view was longer in proportion than fifteen minutes to an interior.

Mr. Fassitt: I have exposed dry plates, and developed some of them at once, and others after three weeks, and found no difference in the result.

On motion, Mr. Corlies and Dr. Wilcocks were appointed a committee to examine and report upon the durability of a latent image on iodide of silver.

Mr. Fassitt reported that the books ordered had arrived in New York, but were in quarantine.

The subject of equivalent focus was brought up. Dr. Wilcocks stated that he believed the equivalent focus of a combination was the focal length of a single lens which would, at the same distance, produce an image of the same size. The subject was discussed by several members, but the president was of the opinion that the above was the true definition.

Mr. Brown exhibited a magnesium lamp for magic lantern purposes. It was smaller and much more convenient than the one previously described in *The Photographer*.

On motion of Mr. Tilghman, the Committee on the Magic Lantern was discharged.

The rough minutes were read and adopted, and the meeting was adjourned.

Salad for the Photographer.

Convenient Silver Saver.—The following arrangement for saving silver is described by a correspondent of the British Journal. While it will not save every particle of silver, it will save immensely. It consists of an oblong box divided by a diaphragm of fine linen, stretched tightly upon a frame. Into one of the halves or compartments the waste-pipe from the sink enters, and on the outside of this compartment an inverted bottle (into the neck of which is fitted a gutta-percha tap) is fixed; joining the tap is a small glass tube, which enters the box just above the waste pipe. This bottle is filled with either hydrochloric acid or a saturated solution of common salt, and when the waste water, &c. is entering the box, the gutta-percha tap being turned, allows the acid or salt to trickle down the glass tube into the water, throwing down the silver as chloride. The water filtering through the diaphragm into the other compartment, is carried off by a pipe fitted thereto; a shallow tray is placed in the first compartment to receive the chloride, and can be removed through a lid in the top, when needful. To prevent unnecessary solutions passing into the box, I have a tap fitted into the main waste-pipe leading from the sink to the drain, and just above the tap a small pipe is let in, so that by turning the tap, and closing the large pipe, the wash solutions are turned into the small one, and so into the box.

Photography on Silk.—The following process for printing on silk was read at a recent meeting of the London Photographic Society, by Mr. H. Cooper, Jr. "Pour 20 ounces of boiling water on 100 grains of chloride of ammonia and 60 grains of Iceland moss. When nearly cold, filter, and immerse the silk in it for fifteen minutes. To sensitize, *immerse* the silk in a 20-grain solution of nitrate of silver for sixteen minutes. Let the nitrate bath be rather acid. When dry, prepare for printing by attaching the silk to a piece of cardboard a little smaller than itself, by turning the edges over, and fastening with bits of gummed paper. Slightly overprint. Wash in two or three changes of water, and tone in a gold bath made thus: 20 oz. water, 2 drachms acetate of soda, 4 grains chloride of gold, and a few grains of common whiting. Filter and keep for twenty-four hours before using. Let the prints be toned slightly bluer than required to be when finished. Rinse them in water, and fix in a solution of hypo, 4 ounces to the pint of water. Twenty minutes is ample time for fixing. Wash well."

To Mount on Tinted Board.—Those accustomed to using mounting boards with lithographic tints, such as we use for our pictures, have been much troubled as well as ourselves with the prints coming off the mounts. If the board be wet with a sponge so as to thoroughly remove the *grease*, no further trouble will be experienced. Unless this be done, the prints will curl off. The best paste we have found for mounting on tints is white glue, but it sometimes fails to answer the purpose fully.

Starch Paste.—This paste is often used by photographers for mounting their prints, but it is very apt to turn sour and mouldy, after keeping for a short time. If a little alcohol be mixed with the starch immediately after it has been dissolved, fermentation will be prevented, and the starch will keep good for a long time.—*British Journal.*

Apparatus for Drying Negatives.—Those who have not the conveniences of gas or fire for drying their negatives will find the following plan, communicated to the British Journal, a very handy and useful one. Of common tin have a vessel made of triangular shape of the size desired. A round aperture in the top serves for the admission of hot water into the vessel, the sides of which are perfectly flat, and at the bottom of which a projecting ledge is placed for the plates to rest upon. The Λ shaped ends of the vessel are carried a little lower than the bottom, and answer as a stand. It

is surprising how long it remains hot; one supply of boiling water will be found sufficient for the preparation of a dozen plates. It will be found particularly useful for drying negatives.

A similar apparatus has been patented in this country, and is for sale by the dealers. It is arranged so as to fit upon a coal oil or other lamp, and so as to be heated thereby. There is less danger of cracking the negative or picture by the former plan.

Photolithography. — Mr. J. W. Osborne, whose admirable photolithographic process was published in this Journal last year, has formed a company in New York for working his process, which has been chartered, and is under the charge of Sidney H. Gay, Esq., President, and the office is at 95 Liberty Street, New York. Mr. Osborne promises more particulars presently. We wish him every success.

Kid Gloves and Photography.—An enterprising firm in Brussels employs one person to make sittings only. This individual is dressed in the latest style, and always wears white kid gloves, while posing the subject. No pair of gloves is used for more than one sitter without being cleaned, as each one is honored with a fresh pair. The contract for cleaning the kids used by this personage is said to be worth several thousand francs per annum.

Photography has been defined as Justice without Mercy, and, like a child, sure to speak the truth when you don't want it to.

Why is a photographer a thief, and yet not a thief? Because he daily takes pictures that are not his own, with the consent of the owner.

Right to Exhibit a Specimen.—Two cases have occurred lately in England, where photographers exhibited pictures of parties without permission. Refusing to remove them in both cases, the offended parties proceeded to destroy them with umbrellas and canes, and at the same time damaged the show-cases of the defendants. The Lord Mayor of London justified such proceedings, and said under similar circumstances he would have done the same.

Photography and Astronomy. — Mr. Warren De La Rue, with his 13-in. telescope, has obtained photographs of the moon so perfect that they bear being enlarged to a diameter of three feet; and they are found to be so exact, when submitted to microscopical examination, that they furnish correct data for the measurement of the vibration of the moon. They serve also as a foundation for the lunar map, six feet in diameter, undertaken under the auspices of the British Association. Photography has enabled us to determine the relative heights and depressions of the mountains and ravines with which the surface of the moon is corrugated. Nor have the labors of the photographer been confined to one satellite; excellent pictures of several of the planets, also, have been obtained.—*Scientific Review*.

Still another Use.—A miner in England had been requested by a rich uncle to send him his photographs in his digging, and in his Sunday clothes. The shrewd fellow went to the studio, clothed in his worst rags, and, after tearing them in several more places, sat for his portrait. This he sent to his uncle with the assurance that he would send his picture in his Sunday clothes as soon as he got them! Need it be added that the uncle's heart was melted?

Photographers' Relief Fund.—We are glad to notice that the suggestion by our friend, G. Wharton Simpson, Esq., that a photographer's relief fund be established in England, is about being successfully carried out. A gentleman offered to join nineteen others in contributing twenty pounds each to start the thing, and quite a number have already joined him. Another offers to be one of a hundred to contribute five pounds. Properly managed, such an institution cannot fail to do much good, and we should be glad to help such an association in forming here. What do our readers think about it?

A couple of enterprising young men are pushing a thriving photographic gift enterprise in New Jersey. They make your picture, and give you a ticket entitling you to a gift. Sometimes you get one, and then again you do not.

Editor's Table.

A Gratifying Testimonial.—From Messrs. Willard & Co., 684 Broadway, New York, manufacturers of the already celebrated lenses bearing their name, we have received the following very gratifying testimonial. Speaking of their cameras, they say, "We have never seen the advantages of advertising so forcibly as on this particular article. We are daily in receipt of orders or letters of inquiry about cameras from parties whose attention has first been directed to them by the advertisements in *The Philadelphia Photographer*. This leads us to believe that it has a large circulation, and for which we tender our congratulations."

Such commendation from such a worthy source is, of course, very gratifying to us, and it may gratify our readers to know that this Journal daily increases its circulation, and widens its influence. It travels from Canada to Cuba, and from here to Salt Lake City. As an advertising medium it is the best of its kind in the United States.

Our readers have noticed, we trust, that no pains or expense is spared to make this Journal useful, interesting, and valuable. During the coming month we would be obliged, if all of its well wishers would send us the names of the photographers in their vicinity, so that we may reach them by circular or sample copy. We particularly desire this from our friends in the West, Southwest, and South. Please see notice to subscribers in the front of this number.

Delinquent Subscribers.—There are still a number of our subscribers who have not paid us for their subscription this year. Now, good friends, if you read this Journal, you can plainly see that no pains or expense is spared in getting you out a good and useful and beautiful Journal of Photography. To do this, we require money—all we can get—and trust you will at once send us on the amount due us, as we need it *now*. Please remember this.

Swiss Albumen Paper.—In presenting the picture of the Oil Well with our April issue, we forgot to mention that the prints were made on the Swiss albumen paper so justly celebrated and extensively used in Europe. It has a remarkably fine surface, and is susceptible of very delicate manipulation. Those desiring it may obtain it through Messrs. B. French & Co., sole agents, Boston, Mass.

February Numbers Wanted.—We will pay fifty cents each for February copies of this Journal for this year. We would feel grateful to any one having an extra copy, if they will mail it to us with their address, and we will remit the amount by mail to them.

January (1865) Numbers Wanted.—To accommodate a few friends, we would like to buy all we can get of the January (last year) issue of this Journal. We will pay 75 cents for them. Please mail without folding them.

Copies Lost in the Mail.—Not unfrequently we receive complaints from our subscribers that their numbers have not been received. No doubt they are stolen in the mail for the pictures, and we have tried to guess and find out; meantime we duplicated copies to all complaining. It has become too severe a tax upon us, however, and hereafter we must ask that those desiring odd numbers will please remit the amount to pay for them, as we always send each subscriber their copies soon as issued, and cannot take the risk of the mail. In such cases subscribers will receive duplicate copies at forty cents each.

Photographing in Salt Lake City.—We have had several pleasant visits lately from Mr. C. R. Savage, of Savage & Ottinger, Great Salt Lake City, Utah. Mr. Savage gives us a graphic description of the hardships of the photographer in his region, and has come East to lay in a stock of better apparatus. He is having an immense wagon built to travel home in, and it is his intention to photograph along the whole route from Nebraska to Utah. We shall expect some fine things from him. Mr. Ottinger sends us an oil painting of the mountain height from which the Mormon flag first caught the breeze in Utah.

Photography and Mythology.—We have received from Mr. Adolph Moses, Quincy, Ill., 61 cards, copies from the illustrations of an ancient work on mythology, but too late for a full notice until our next.

Panoramic Views of Philadelphia.—Mr. R. Newell has recently made some very fine stereoscopic views of our city. His camera was placed in the State House steeple, and we have views east, northeast, northwest, north, and southeast from it. They are very successful and very interesting.

The Steinheil Lens.—We have been daily expecting a Steinheil lens from Messrs. B. French & Co., but at this writing it has not yet arrived; so we can report no experiments with it. They have sent us, however, three prints made with the Nos. 6 and 7 lenses, of the building of the Zoological Society at Munich. The subject chosen is a pretty severe test for any lens, but in these, every pillar, post and piece of work is free from distortion, and the whole are as sharp at the outer edges as in the centre. The width of angle is truly wonderful, and it is seldom we see such gigantic photography as these prints represent. We hope to be able to say more about these lenses in our next. We believe they are now for sale.

Photographic Mosaics.—This valuable little book continues to sell splendidly. Stockdealers are ordering their *fourth* lots of them, and we daily mail a quantity of them. The second edition is more than three-fourths exhausted, and still the orders increase. It is full and overflowing with valuable information, and the price places it within reach of every one. 144 pages, closely printed, for fifty cents!!

"It gives in plain, intelligible language, the best, and latest instruction on photographic matters, and is equally useful to the beginner and proficient."—*E. G. Squier, Esq.*

"It consists of a collection of small articles on photography, which would be difficult for any one to refer to as quickly as desirable, unless thus collected and preserved. Every photographer will find it valuable to him in the prosecution of his labors."—*Journal Franklin Inst.*

Prof. Towler, editor of Humphrey's Journal, is very lavish in its praise, and says, "This little work is, as the name indicates, a sort of tesselated pavement, whose squares are richly garnished with photographic delicacies. We have not only looked it over, but perused it with great satisfaction, and shall frequently recur to its choice contents as a book of reference. Can any practical photographer be found so ignorant of his interests, and so indifferent to them, as to learn that such a work has been published, and not purchase a copy? To such a one may be applied the adage, 'Penny wise and pound foolish.' For sale by all stockdealers at fifty cents per copy."

Piracy.—It is astonishing how many there are even in our little circle who are willing to commit open piracy, unabashed. Without mentioning any special case, we will only enter our protest against certain parties who have habitually taken the processes of one of our esteemed contributors, modified them clumsily, and then offered them as their own with the most dishonest impunity. They are like the foolish ostrich when pursued, and think that if they hide their heads in the brush-heap of some foreign journal willing to aid them, that no one will discover their game, but, alas! they are greatly deceiving themselves in endeavoring to deceive others.

The Gelatine Developer.—The editor of the Camera Oscura, published at Milan, Italy, has a very laudatory article on the Gelatine Developer. He has collected all the formulæ that have been published, and remarks that he habitually uses it. We are glad to see that Mr. Lea's discovery is becoming more and more popular wherever it is fairly tried.

Litho-photography.—The Photographic News of April 20 was accompanied by a very fine specimen of *litho-photography* by Messrs. Bullock Brothers' new process. The subject is a small grove of trees with a pathway through, and the negative was made *from nature* by Major Gresley. All of our readers know the process for making photo-lithographs, in which a drawing or engraving has been found necessary to begin the operation with. The aim of the Messrs. Bullock is different, however. They reproduce a photograph from nature in all its true gradation of half-tone, lithography being made an adjunct to photography simply as a means of rapid and permanent printing. Hence they call their process *litho-photographic*. The specimen sent is certainly much superior to anything of the kind we have ever seen, and very pretty, but far from being as perfect as a photograph. The British Journal, of 27th April, is also accompanied by a print by the same process. It is an architectural view, and not to be compared to the other.

Our Coming Issues.—We are enabled to announce some very beautiful pictures with the numbers following this. We have in preparation a very beautiful garden scene, by Messrs. Loescher & Petsch, of Berlin, and portraits from life, by Mr. William Notman, of Montreal, both of which will be accompanied by cuts of the skylights in which they were made. We are also printing a composition picture from negatives by Mr. F. A. Wenderoth, which will be very useful as a study to all, and shall probably ere long present a copy from some handsome engraving, with a paper on the subject of reproductions.

THE

Philadelphia Photographer.

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EXPERIMENTS WITH THE ANILINE PRINTING PROCESS.

You know already, that the sensitizer in this process is a solution of bichromate of potash mixed with phosphoric acid. Paper floated on this solution, and dried, is of a yellow tint, which becomes afterwards a light green. The sensitized and unexposed paper assumes in vapors of aniline a blue violet tint, more or less intense.

Therefore, if you expose the paper under a positive print (a drawing, lithograph, &c.), you obtain a white pale drawing on a yellowish green ground, which becomes quite visible on the blue violet tint after fumigation with aniline. For trying this printing process, we endeavored at first to ascertain the influence of the quantity of phosphoric acid and bichromate in the sensitizing solution, and we have found that the intensity of the tint, which the picture assumes in the fumigation with aniline, increases with the quantity of chromate of potash, and much more with the quantity of phosphoric acid. On the ground of this principle we increased the quantity of phosphoric acid, more and more, in our experiments, and stopped at last at the following proportions:

Bichromate of potash, . .	1 part.
Water, ...	10 parts.
Dissolved phosphoric acid, specific gravity, 1,124, . .	10 "

In this solution we let the paper float one minute. By allowing it to float longer, the solution penetrates, and the back of the paper also becomes colored. In order to hinder this penetration, it is good to dry the paper quickly, best in a warm room. The paper itself plays an important part. With Rives' paper we got no satisfactory results. It became easily stained and appeared much less sensitive than Steinbach's. The latter (Saxe paper) gives excellent results.*

As already remarked, the printing takes place under a positive. The parts lying under the transparent spots of the positive become light green, the others remain yellow, and one gets thus a yellow drawing on a green ground. By lamplight this is less visible, and is better in daylight. This pale yellow picture takes a bluish tint in the vapor of aniline. If the paper is under-exposed, the ground also becomes colored; if it is too long exposed, it becomes colored very slowly. Hence, one can see, of what importance the time of exposure is.

In the case of positives with semitones, one must often examine them, until even the details in the dark part begin to be visible in a yellow color. In copying drawings, after a short time the whole picture is visible; but

* From an article by Mr. Dawson, in the British Journal, we see that he has had similar experience.

after bringing it in the vapor-room, the green ground which should remain light, becomes blue. Thus, it is necessary to expose until the ground is perfectly reduced in the light, *i. e.* till it has lost its liability to become blue in the aniline vapors. The time of exposure must be regulated according to the thickness and transparency of the paper. For drawing on Whatman's paper we required in clear weather half an hour, for thick paper one hour and more, and for very thin paper some minutes. If one prints too long, the image sinks into the paper, and is often visible before and behind.

But there is a means to fix with considerable certainty the time of exposure by any light, and with any paper positive, where this is not yet known from experience. If the picture becomes visible in a yellow color, cut off a small piece from the edge of the yellow paper, that is, where it lies under the drawing to be copied; and bring it into the vapor-room. If it colors here within ten minutes, the drawing is still not sufficiently exposed. Repeat the test after some time. If the proof piece no longer colors, the drawing is sufficiently exposed, and can be fumigated in aniline.

A person experienced in this printing process will seldom require to employ this test. As a matter of course, the intensity of the ink or color in which the drawing is made is a matter of great consideration. If this is gray and transparent, as, for instance, in pencil drawing, it is difficult to receive a deep color. Transparent collodion positives copy best. The time of exposure for these is from one minute to one hour, according to the light and the thickness of the positive. In the development these are kept as dark as possible in the shadows, and clear in the light parts. The aniline process can here be of importance for enlarging. An enlarged positive is made from the original negative, and this is printed off according to the new process.

In drawing, the thickness of the paper is also of importance. If this is thin in the copying, lay the face uppermost, and a positive is got directly in the proper position. But if the paper is thick, the copying would lack sharpness if such a process were followed. In this case the face must be placed upon the sensitive paper. Then a sharp copy is produced, but inverted. In drawing, this gives little trouble, although here the figures and letters are also inverted. (Here the prints which are copied through, *i. e.* where the picture is visible, also, at the back, are of advantage, because at the back it appears in the proper position.) A method tried some weeks ago of making drawings transparent with benzole, did not yield us in later experiments such good results.

In the case of collodion positives, the inversion of the picture can be easily avoided, if they are taken from the very beginning in the proper position. (The positive must then have the same position as the original negative, if both are seen from the same side.) Drawings on dissimilar paper become, of course, easily dissimilar. The steaming is performed in a flat dish. The pictures are laid on the bottom of it, and a cover of wood is put over it, on which blotting-paper is mounted, and this latter is moistened equally with a solution of

1 ounce benzole.
30 to 40 drops aniline.

The richer in aniline, so much the more quickly does the solution work. This must be poured on as equally as possible, otherwise individual parts remain behind in the development.

The picture appears after some minutes, if it is not overexposed, and increases continually in intensity. Its color is impure black-blue-green, but becomes a beautiful blue when put into water. If very long vapored, the tone of the picture becomes more brownish black, and more suitable for portraits. If for a short time steamed, the tone is more blue. The duration of the development depends entirely on the proper time of exposure. Drawings which were somewhat too short a time exposed, should not be too long vapored, because otherwise the ground would become colored; overexposed ones on the other hand do not give a picture till after a long development. A slight over-exposure and a somewhat longer development would recommend themselves for portraits, if one wishes a more brownish black tone. Sometimes the picture appears green in the washing water. This does not matter.

One can quite easily convert the green color into blue, by putting ammonia into the washing water. The tone of color becomes green through acids; through ammonia (or alkalies in general) blue. The bathing in acid has the advantage of being able to dissolve the protosulphate of chromium, which otherwise remains in the picture, and colors it. So far we succeeded in getting the ground clearer, if the copy is put after the first washing into 100 times diluted sulphuric acid, then washed, and lastly colored again blue by being floated in 100 times diluted solution of ammonia. In the solution given above, rich in phosphoric acid, such an acidifying of the copies is not necessary. They become clear enough without it, if they are only properly exposed. Sometimes the pictures appear stained in the soaking, although they were perfectly pure before. These stains, however, disappear again in the drying. Let these be washed in water changed 8 times, and let some ammonia be added to the fourth water, if the tone should appear greenish. Concerning the durability, we have positive experiences lying before us, inasmuch as Willis's prints, which we have in our hands, have lasted excellently for a year. Some of our prints which we made in January have become green. This arises from the imperfect washing, whereby a trace of phosphoric acid remained behind. But these prints are easily made blue again.

DR. H. VOGEL.

INTRODUCTION OF IMAGES BY PRESSURE.

BY M. CAREY LEA.

IN a late number of the "Bulletin de la Societé Française de Photographie," I find an account of some remarks by M. Girard on the subject of the recent experiments which I published on the subject of the capacity of iodide of silver to receive developable images by a simple pressure. Whilst thanking M. Girard for his flattering expressions and his full confirmation of my experiments, I cannot admit that those experiments needed any amplification, or any further precautions to the mode in which they were made; and this, for several reasons. M. Girard thought it desirable to repeat those experiments, using exclusively inorganic substances wherewith to effect the pressure. Now, I consider that my experiments completely disposed of this objection, if made.

1. Because in some of the experiments the whole surface of the iodide came into contact with the organic substance, the only difference being that some parts received more pressure than others. This was the case when letter paper on one side of which printing had been impressed with such force as to raise the lettering on the back. Such paper was laid on the sensitive surface, the printed characters uppermost, and the finger was drawn steadily and firmly over the paper. A developer then brought out the lettering very distinctly. Here the parts adjacent to the lettering came into contact with the organic matter, precisely the same as the lettering. The only difference was in the amount of pressure.

2. But this was not all, metallic and glass surfaces were tried with similar results. In fact, it seemed to make very little difference of what the surface consisted, everything depended upon the pressure.

And lastly, M. Girard's results obtained by pressure with inorganic substances were simply confirmatory of the conclusions already stated.

According to my opinion, these results give a more powerful support to the physical theory than M. Girard seems disposed to admit. I think, in fact, that many, in reasoning upon these facts, do not sufficiently consider the effects that are observable in our every-day working. We know, for example, how slight a cause is sufficient to control and derange the precipitate upon an ordinary negative. The same characteristic result may be seen when silver is precipitated in the metallic state upon clean glass. The condition of the surface of the glass determines to a great extent the deposition, and unless the cleaning has been exceedingly uniform and regular, the tracings and paths which the cleaning body has followed, may be detected in the precipitate.

Whether the power of pressure to control development can ever be turned to useful purposes, it is difficult now to say. In the present it has simply a scientific interest.

PHOTOGRAPHING CHILDREN.

Photographing children is, to many artists, a real trial of patience. We have known great strong men who would march right up to the mouth of blazing cannon in defence of their country, to dread the appearance of a child in their ateliers. We have, in our mind, now, such a man, who, although weighing quite two hundred pounds, makes it a practice to refuse to take pictures for these very important members of the household, and used to consider that he was playing a good joke on a more amiable brother artist, by sending all of his junior applicants to him to be taken.

Now, there is no real cause for this fear and trembling on account of the little ones. They are really not half the trouble we imagine they are, and not so much as children of larger growth. They never criticise your work, or ask you to sit them over. They are no trouble at all, and only require a little study of their natures and a little gentle dealing—just the same as your grown customers. If, when they enter your room, you become annoyed, and make up your mind that you are going to have trouble, you had better postpone the job until you are yourself in a more amiable mood.

Receive the little ones kindly, and try to win their confidence. If they resist your advances, produce some toy (of which you must have a variety on hand) to amuse them, encouraging the idea that that, and not picture-making is your purpose. Presently you will be enabled to sit them in the best light, and perhaps coax them to watch your funny movements behind the camera. Try again if you do not succeed at first, meanwhile not being in too great a hurry.

Now is your chance! Out with some new toy, and while the child is looking, expose the plate. Have another one or two ready, and try again, to save a repetition of the coaxing. Encourage the youthful mind a little, should it be found needful, with a new noise or funny movement, and try again. Child nature varies as much as older nature, and experience must teach one how to act. A loud noise would attract and please some, and frighten others. Ringing a bunch of keys, jingling a triangle, shaking a watch, chirping like a chicken, whistling like a bird, and crying, Look! look! look! are all common expedients, and very good in some cases, but it will be a saving of time to win the child's confidence first. This may be done in many ways, and the more like a child you allow yourself to become, the greater your success will be. If it is a tiny one, attract it with some bright object, and always present it when the little hands are put out for it. If it is too old for that, play a game of "hide and seek" with it, if it is willing, or run your fingers over it, imitating a "little mouse," at the same time make it believe that you yourself think it all fine fun. Baby will not keep you long. It will soon repay you, if you enter into the spirit of the thing, and manage rightly. If it can talk, have a "ragdolly," or a bird, at hand, and tell it a short story, and even permit it to tell you one, should it be so disposed. Listen attentively, and you will find attention will be your reward.

Never deceive children. Deception may keep them quiet once, but it will fail the second time. If you promise a bird to come out of the camera, have one ready to produce when the exposure is ended. Don't jump up and down, and flap your arms during the exposure. This will give the child an anxious, worried expression, which will not be what you want. With a clear light, a quick lens, sensitive collodion, patience and good nature, in most cases success will crown your efforts. But, if you consider children a nuisance and a bore, you had better not try to take them. Send them somewhere else; but remember that children are the doors to the parent's hearts, and if you make good pictures of them, you are pretty sure to secure the rest of the family, and their friends and relatives. Having had several years' experience in the business, we have often noticed that a successful picture of a child often led to large orders and permanent customers. For this reason we spared no pains with the little ones.

We know there are exceptions to these rules. We have known baby to kick up a regular tempest at the sight of a strange room, and have seen as many as nine negatives made of one little girl, eighteen months old, but such cases are rare. There is a *way*

to take such children, and the thing is to find it out. Although we gave up the child in question after the ninth trial, we have always believed that if we had tried the tenth time, we should have found out the way to take its picture, and it has always been a source of regret that one more effort had not been made. Conversing with a photograper of some experience a short time ago upon the subject of taking children's pictures, he asserted that he never failed in taking any child's picture yet, and related the following as the most desperate case he had ever had. A little girl, the only child of a widowed mother who had lost husband and other children, without a picture of them, was brought to his room to have an ambrotype taken. The minute he made his appearance, the child began to cry. He tried playing, petting, persuading and promising, but no use. He therefore focussed as carefully as he could, and then giving instructions to a friend who accompanied the child, how to place the holder, and cover the lens at the end of the exposure, he stepped out of sight, leaving the lady to make the exposure, telling her to count thirteen, and sixteen if she could. The child kept still for her, and a fair picture was made. This he took and showed to her, and it won her confidence. He had no trouble in making a picture for each of her six attendants after that. He found out *the way*, and deserved credit for his ingenuity.

We have another *exception* of the masculine gender, about eighteen months old, in our own family. His principal objection is to the head rest. He is not afraid of it, but it excites his curiosity, and as long as it remains, his picture cannot be taken. We are now drilling him at home with a head rest, and as soon as we succeed in keeping him from looking around at it, we expect to get a good picture of him. It is the *way* to do it, and knowing the way, why not follow it.

Although we have nearly three hundred pictures of babies and children in a box by themselves in all sorts of beautifully graceful and lovely attitudes, we have none more charming than a series recently received from Messrs. Loescher & Petsch, of Berlin. They are charming in the extreme. They are by no means "extremely sharp and crisp," nor superior in tone and finish, but they are handsome, natural pictures, every one of them. These gentlemen, who are doubtless born artists, as will be seen by our picture in the present number, have given titles to these pictures, and we have a young scrub of three years with hands in his pockets, and wide-spread legs exhibiting his first pair of pants; a second is a merry little miss of four, exhibiting her new slippers. Then we have the "Little Brewer," "The Gardener," "The Sick Baby," "Tired Out," "Am I not Beautiful?" &c. &c., each one of which is a perfect joy and gem. Such pictures must be precious boons to the parents, and have a large demand for them.

Our word for it, that no time is ill spent in trying to make a good picture of a child. Generally, it requires no more than is spent over grown people. Make up your mind it has got to be done, and go at it with a right good will. This is everything after good lenses and light.

CLIPPINGS FROM THE BULLETIN BELGE.

Translated for The Philadelphia Photographer.

BY PROSELYTE.

Toning Bath, by Benque, of Trieste.

No. 1.

Water,	540 grams.
Citric acid,	4 "
Bicarb. potassa and soda,	35 grams.

No. 2.

Chloride of gold,	6 decigrams.
Water,	540 grams.

Mix the two solutions, and the bath is ready for use. This bath tones with great uniformity to a blue black. The above formula is for 12 sheets of paper.

Grüne's New Method for Touching up Negatives.

Mix equal parts of turpentine and lavender oil, and with a camel's-hair pencil dipped in this mixture, brush off of a condemned unvarnished negative the gray precipitate of silver found on its surface. You can then, with this pencil, touch up your defective negative. This method offers the advantage of using a powder, similar in all points to

that laid on the negative you wish to correct. The oil used by painters on porcelain (thickened turpentine) can also be used for the same purpose.

Dr. Schnauss's Sensitizing Bath for Prints.

As the author draws the attention to the fact that albumen contains, as valued by Poleck, $7\frac{1}{2}$ per cent. of chlorine, he uses unsalted albumenized paper, and with the following formula his prints leave nothing to be desired in the way of depth and brilliancy:

Water,	500 parts.
Saltpetre,	32 "
Nitrate of magnesia,	32 "
Fused nitrate of silver,	9 "

Print as deep as on ordinary paper and tone in an alkaline bath. The proofs are not altered in the fixing bath.

Preservation of Nitrated Paper, by C. Ommeganck.

To preserve sensitized paper, three conditions are required: 1st. Absorption of humidity; 2d. Absorption of the ammonia always present in inhabited places; 3d. Destroy the sulphuretted hydrogen more or less found in the atmosphere of cities. To this last body particularly must be attributed the coloring of the paper.

Chloride of calcium answers to the two first conditions, but not to the last, and after different trials with different bodies, the author comes to the conclusion that the sulphurous pumice-stone fulfils the three above-named requisites.

Take large fragments of pumice-stone, wet them with sulphuric acid, and heat them to redness, in a crucible. Take a lamp or gas-burner chimney, and lower it to within about three centimetres of the bottom of a wide-mouthed jar, only of a diameter of two centimetres larger than the chimney. Affix firmly said chimney to the neck of the jar, by means of three pieces of India-rubber, and when this is done, introduce your pieces of sulphurous pumice-stone (commencing with the largest pieces), and pour on about twenty centimetres of sulphuric acid. To keep this apparatus in working order, it is only required to add five centimetres of acid at a time. The acid diluted by humidity accumulates in the jar, and can easily be poured out by the sides, if care has been taken to force in the first piece of pumice-stone. This apparatus is now placed in a wide-mouthed jar with ground stopper, and is always ready for use.

Preservation of Pyrogallic Acid in Solution, by C. Ommeganck.

Solutions of pyrogallic acid are rapidly deteriorated, and particularly so in summer. It is true that when citric acid is present, the solution keeps longer than when acetic acid is in combination; but the photographic action of these two acids is quite different, and cases occur when acetic acid alone is required; in that case an addition of a very small quantity of citric acid suffices to give the keeping qualities to your solution, without destroying the photographic reactions of acetic acid alone. For instance, in dissolving 1 gram of pyrogallic acid in 250 cubic centimetres of water, and adding $\frac{3}{100}$ grams of citric acid, this advantage is obtained.

MISCELLANEOUS PHOTOGRAPHIC HINTS.

BY M. CAREY LEA.

Cleaning the Fingers.—In the course of the experiments which I made in the action of pernitrate of mercury upon silver films, I was struck with the great facility with which it dissolved all the silver compounds with which one has to do in photography. It occurred to me that this solvent power might be turned to account in two ways.

First, that it might be used for reducing over-developed negatives. I was prevented from trying this, in consequence of having observed that when it dissolved a developed film, the film did not seem to thin down regularly, but dissolved first at the edges, and continually diminished in size till only a small spot was left in the centre, which finally disappeared. It appeared to me, therefore, that its action would be too powerful in the parts already too thin, in comparison with the central. A friend, however, to whom it occurred independently, made the experiment, and obtained a favorable result.

The other application was to cleaning off

silver stains. I tried this on my own hands, and found it answer very well. But I was deterred from publishing or recommending this method from the consideration that the frequent absorption of mercury by the cuticle must be very injurious to the system, especially with a cumulative poison like mercury. My only reason for now adverting to this power of the pernitrate of mercury, is the idea which I have that it is now offered for sale for this purpose. I, therefore, think it well to warn all photographers not to fall into regular use of so dangerous a preparation. I think it almost, if not quite, as dangerous as cyanide. For, if it is not so active a poison, it is more treacherous. Cyanide, for the most part, acts rapidly, and it would seem that the system, to some extent (though not without certain injury), habituates itself to its influence; with a mercury salt, even this slight alleviation of the evil is absent. The system does not seem to have the power of ridding itself of this most subtle poison, but each fresh application tends to increase the mischief. I am, of course, aware that it is not possible to reason rigorously from the effects of ingestion into the stomach, to those of cutaneous absorption, but I do know that the most fatal results follow the absorption of solutions of lead in factories, where the workmen are frequently exposed to them, and I am very sure that the use of mercurial solution, as a detergent, is quite unjustifiable.

I have latterly used a good deal the following means which I find quite useful. Make a pretty strong mixture of solution of bichromate of potash and sulphuric acid (say two parts saturated solution of bichromate, three of water, and one of sulphuric acid, or even stronger). Wash the hands well with this. Then rinse them off, and have at hand some of Lugol's solution, which, for this purpose, may be made as follows: iodide of potassium, ¼ oz.; iodine, 40 or 50 grs.; water, 10 oz. After rinsing off the bichromate, wash the stains with this solution. Under its action, they rapidly lighten in color, but the hands become stained deep-orange color by the Lugol's solution. Finish with some negative hyposulphite, which clears off all that remains. I am informed by a friend that the professional photographers, in his neighborhood, have adopted a similar treatment, except that instead of Lugol's solution they use, after the bichromate and sulphuric acid, a plain solution of iodide of potassium without the iodine. I have not tried this, but should think it would be rather less effective than that just mentioned. If, indeed, a solution of iodide of potassium be applied before the bichromate is quite washed off, some portion of the iodine would be immediately set free, and a sort of Lugol's solution is thereby formed.

Trivial as this matter may seem, I think the information will not be unwelcome, for the staining of the fingers is felt to be so great a nuisance that men will risk their health to get rid of it. And as this last is quite unnecessary, it seems to be well to give a wide publicity to the simple and comparatively innocent means above described.

How to Empty a Glass Bath.—Another of the minor miseries of photography is the emptying off a large glass bath, very full of valuable solution, and with no lip, an appendage which is generally omitted from glass baths, in order to admit of grinding the top edge. Whoever has splashed his bath over everything around in emptying, with waste and mischief, will not hold the following hint to be worthless. Take a suitable glass jar or beaker, hold your bath in one hand, rest the upper edge half an inch over the edge of the beaker. Now, with the left hand, *incline the jar or beaker forwards* towards the bath at an angle of forty-five degrees, then empty your bath.

Simple as the above may seem, it is a fact that it will enable one to empty the fullest bath without spilling a drop, a performance which cannot, I believe, be accomplished in any other way. If the bath is large, it will be found convenient to stand well over it, taking it by the underside, so that the bath is between the arm and the body.

Cleaning Plates.—The cleaning of glass plates, by a mixture of bichromate of potash and sulphuric acid and water,* has come into extensive use, and I have lately become aware that some who have tried it have neglected

* Bichromate of potash, 1 oz.; sulphuric acid 1 fluid ounce; water, 1 pint, or less.

certain necessary precautions, for which reason I make my directions a little more explicit.

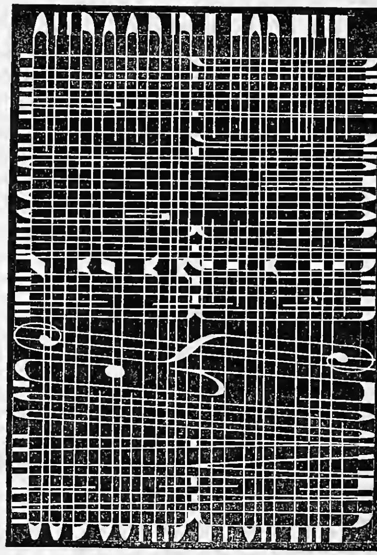
The cleaning mixture requires to be very thoroughly removed from the plates, else they will render the bath acid, and insensitive, besides tending to weaken the film, and to produce pinholes. Now, if a batch of plates be lifted from the cleaning solution, and thrown into water at once, it is almost impossible that the film or solution which remains between the plates should be as thoroughly removed as it ought to be. Therefore, each plate should be thrown separately into the vessel of water, the water running all the time. When all are in, incline the vessel so as to empty it *completely*, and then let fresh water run in for some time. The assistant who cleans the plates, before rubbing them dry with paper, should hold each plate for a moment under the stream of water, first one side up, and then the other.

Similar attention is requisite in placing the plates in the cleaning bath. They should not be placed in all at once, but one by one, at opposite ends, and lapping a little over each other, so as to leave a certain quantity of fluid between each.

This, at least, is the system which I have in use myself, and I would not, on any terms, return to the old methods. All the cleaning with rotten-stone, tripoli, old collodion, &c., becomes perfectly superfluous; the plates take care of themselves, and the trouble of this part of the photographic manipulation is reduced most satisfactorily. But if the little precautions above mentioned be neglected, the method cannot be expected to give good results. Nor should I have thought it worth while to detail them here, had I not become aware that the need of them had been by some overlooked.

MYSTIC DESIGN FOR CARD-MOUNTS.

A GREAT deal of taste and a great deal of ingenuity has been expended and displayed in getting up designs for the backs of card-mounts. Each photographer seems to desire something different from his neighbor, and so distinctly so, that his pictures may be known at a glance.



Copyright secured by Andrew Peck, N. Y.

Above we print a design that at first sight seems a conglomeration of marks and scratches made upon a block of wood, at random. However, such is not the case. It is a capital design for a card-mount. It is mystifying, amusing, entertaining and surprising, when you find out what it is. The photographer who adopts it will find it to attract trade to his rooms, and people will go to him, and get pictures made purposely to get some of his cards to amuse and puzzle their friends with. At a party or on a journey, they make pleasure, and relieve many dull hours.

They are manufactured by Mr. Andrew Peck, 109 Nassau Street, New York, to whom the copyright belongs. The wording may be changed to suit the purchaser's location and name. Mr. Peck will furnish the wood-cuts for them, and print the cards if desired, or any printer may print them.

Mr. Peck publishes a series of seven different kinds of mystic mottoes; he will send a sample of each kind by mail to one address for forty cents, and we were so pleased with them that we thought they would be an immense card for any one adapting them to the use we have suggested, and that we would suggest the idea to them.

If our readers have turned it, and looked at it in every way they can imagine, and cannot yet read it, we will tell them how. Hold the page at a little distance, inclining it downward at an angle of forty-five degrees; partly close the eyes, look sharp, and the puzzle will appear as plain as day. It must be looked at both laterally and perpendicularly, to secure the whole sentence, and after those have read it who are not subscribers to this Journal, we trust they will not be puzzled to raise five dollars to obey its gentle hint.

ON THE INFLUENCE OF IODIDE AND BROMIDE IN COLLODION.

Collodion has now been so long in use that it is hardly to be supposed that much, or perhaps anything that is entirely new, remains to be found out respecting its action. And so, with respect to the influence which the relative quantities of iodide and bromide used exert upon the picture. Nevertheless, all this is a matter of first-rate importance to the operator, and we cannot forget that collodion was in use for years before the advantage of the introduction of even the smallest dose of bromide was acknowledged some sixteen years since. Therefore, it does not altogether follow that our knowledge is as yet entirely complete. And any little addition to our stock of information will doubtless be acceptable.

What I propose to remark upon here, is the curious fact which I do not think has ever been before distinctly stated, that the defects which too much bromide in collodion produces in the picture, almost exactly resemble those that result from too much iodide. What I mean will appear more distinctly from some experiments which I am about to describe.

It has been lately shown by Dr. Vogel that when a bromide is introduced into a simply iodized collodion, the film loses in its sensibility to strong light, precisely as it gains in susceptibility to the action of weaker rays. My experiment shows on the other hand that the addition of a large quantity of bromide destroys the sensibility, not to the stronger, but to the weaker rays—just the reverse of what would have been expected *à priori*—that with a large excess of bromide we may get just as harsh a picture as with too little.

Two collodions were prepared, using the same plain collodion, but with the following salting:

No. 1.

Iodide of cadmium, . .	4 grains.
Bromide of ammonium, .	2 "

to the ounce of collodion.

No. 2.

Bromide of cadmium, . .	2 grains.
Iodide of cadmium, . .	2 "
Bromide of ammonium, .	2 "

to the ounce of collodion.

It will be observed that even the first of these contains what would be considered a full dose of bromide. Both formulas were so arranged as to contain two grains of ammonium salt and four grains of cadmium salt to the ounce, and the relative proportions of iodide and bromide were reversed in the two. In the second formula the dose of bromide was made exceedingly heavy, in order to observe with exactness in what way this peculiarity would mark itself on the developed image.

Two plates were tried with each of these collodions. The exposures were made at a time, when the light was exceedingly uniform, and the developments were made with the following developer:

Water, ...	24 ounces.
Sulphate of iron, . .	800 grains.
Acetic acid, No. 8, . .	2 ounces.

Exposure in all cases, fifty seconds, weather dull and rainy, globe lens, next to largest stop. Light bad, but regular.

In the high lights, the collodion containing most iodide gave naturally the most strength. But in the deep shadows, the contrast was far more striking yet. Collodion No. 1 gave quantities of detail that were quite wanting in No. 2; many places that were full of actinic action in the one, were clear glass in the other. So that violence of contrast, which has been considered the peculiar fault of iodide of silver used with none, or too little of bromide, is just as much the fault caused by excess of bromide, the

difference being simply that density comes more easily with the iodide. But if, with a collodion containing excess of bromide we make up for this by a longer exposure, so as to bring up the dense parts as nearly as may be to the effect of a collodion with excess of iodide, we get a picture with exactly the same faults—excess of contrast and absence of transparency of shadow. Softness of effect does not, therefore, belong to bromide, as is often said, but to the joint action of the two haloids, influencing each other in some way which it is not easy to understand.

A further and important corollary is, I think, to be drawn from this: that the present state of our knowledge of the effect of different saltings on collodion is wholly empirical—depends wholly on mere experiment, and can be reasoned upon but very little. That, therefore, we cannot say with any great certainty, that such a collodion ought to act in such a manner, the most that we can often do, is to try the formula, and note its effect.

The results of some other trials, not necessary here to specify, were perfectly concordant with the above. The contrast between the plates obtained with the different collodions, was so great, that, if mixed together, they could have been separated correctly by the merest tyro, and without a second look. And this, not by the difference of density in the dense portions, but by the characteristic differences in the shadows, in which the effect of the overdose of bromide was far more perceptible than in the high lights.

M. Carey Lea.

PHOTOGRAPHY AND MYTHOLOGY.

Photography has often been spoken of as an educational power, and its application in that direction is becoming quite frequent.

We are led to this assertion by a series of sixty-one photographs before us, copies of the illustrations in Graeffer & Hauter's Mythology, published in Vienna, A.D. 1815. As a helper to the mythological student, they will be found invaluable. The originals are by Schedy, Euder, and Loeder, and have, most of them, been done full justice to by our copyist, Mr. Adolph Moses, of Quincy, Ill.

In reading of the exploits of Hercules, of the sad tale of Hero and Leander, of the petrefaction of Kragaleus, of Bacchus' triumphal march into India, of the punishment of Prometheus, the nursing of Jupiter by the Nymphs, the war with the giants, the cruelty of Medea, the death of Achilles and Chione, and of the jealous Juno, these pictures will be found of great pleasure and benefit, and we think Mr. Moses has done a good work for the cause of literature in producing them. He should be patronized by all of our schools and colleges, as he no doubt will.

As copies, many of them are in every way excellent, which is owing to the skill of Mr. J. W. Banker, the experienced artist with Mr. Moses. The engravings apparently differ very much in beauty and execution, some of them being much better than the others. Some of them were carefully cleaned with soft bread, and enabled the artist to secure much better negatives of them.

The size of the originals is $4 \times 5\frac{3}{4}$ inches. They were copied with a $\frac{1}{2}$ size Jamin lens, reversed.

Anthony's collodion mixed with older collodion was used, and for developer, iron, 1 oz.; acetic acid, 3 oz., and water, 12 oz. The negatives were intensified with dilute silver and iron. The prints are beautifully toned, but how we are not told. Mr. Moses intends getting up a stereoscopic set of them, which will no doubt be acceptable, and which he would like to exchange with brother artists for their stereoscope pictures, &c. To copy such a series of pictures requires much patience and skill, both of which our artist seems to possess, and for which he deserves great credit.

We are glad to learn that they are having a ready sale.

LECTURE ON PHOTOGRAPHY.

BY COLEMAN SELLERS.

Second Lecture, continued.

Not long ago a gentleman, who was making his first attempt at photography, came to me in distress, and said he could not get an image, and he did everything just as I told

him. I said to him, "tell me the processes as you went through with them." "I coated the plate, put it in the bath, then I took it out, and exposed it in the camera, brought it out, and washed it." "Stop," said I, "that was the trouble, you washed it too soon, and washed off all the free nitrate of silver." Washing is a *good* thing, only it was done at the wrong time. If I had washed off this plate before the developer was applied, there would have been no image either.

Now, I intend to dry this, and from it make a glass positive. You observe that, in drying it, you can either allow it to dry spontaneously, or you can dry it over a spirit-lamp very rapidly, placing it freely in contact with the flame, provided you move it about, and allow all parts of the glass to be heated uniformly. Glass cracks, not so much from the heat as from irregular heating and unequal expansion. If I should hold it still over this flame in one place, the unexpanded parts would be torn apart, disrupted, broken. The negative, after it is dried in this way, is then very liable to be injured; it may be scratched quite easily, therefore it should be protected by a coat of varnish. The varnish used for this purpose by some is made of ordinary shellac dissolved in alcohol. A better varnish than that consists of—— (At this instant the glass broke to pieces from the heat.) The lecturer remarked (seemingly with no embarrassment from the mishap) that he was sorry he had lost the negative, and regretted taxing the patience of the audience, but really it would give him an excuse to repeat the process, and thus impress it on their minds. (Loud applause.) He then, while preparing a second plate, proceeded with the account of the varnish used. It consists of gum sandarach dissolved in alcohol, to which is added some chloroform and oil of lavender. This, filtered, forms a clear varnish. To filter varnish, paper should be used, and a glass plate covered over the top of the funnel to prevent the too rapid evaporation of the alcohol. You cannot hurry the process of preparing the plate. If I would put it into the camera with streaks of moisture on it, *each* would act like a little lens, and condense the light on some parts more than others, and produce dark streaks. You must wait till the fluid flows off uniformly. These oil-like lines are exactly similar to the lines on a wine-glass which, when tilted up, shows similar lines flowing down. It is a good thing in the wine, but a bad thing in the plate. (Applause.)

The magnesium light is not white at all, compared with the lime light; it is bluish; it is richer in actinic rays. It contains a great deal of the actinic properties. The trouble was, that looking at the light so much in the exposure of the first plate blinded me, so that I hardly knew what I was doing, and thus lost the plate. The introduction of this magnesium wire into photography marks an *era*. Now, it is quite possible to make photographs of the interior of buildings, and they are at the present time photographing the interior of the Pyramids, and the interior of coal mines. The plate is now done. It is as good as in the former case. (Applause.) Yes, a decidedly better picture than before. There is another use to which this wire has been put, and that is, in photographing *large* pieces of machinery in a *dark place* in the machine-shop, saving thereby the immense expense of transporting and erecting the machinery in daylight, and almost every day there is some new use for the magnesium wire. In that way people have been photographed at their homes, around their own firesides, the room apparently illuminated by the ordinary gas burners, but in reality by the magnesium light.

In galleries where a great many photographs are made, they have an arrangement for washing, consisting of pieces of wood covered with cloth, so that the plate can set on them under the hydrant, when a steady, swift, smooth stream falls on them. The advantage of this cloth is, it serves as a place to wipe the back of the plate upon, and wipe off the reduced silver on the back of the plate, and cleanse it at one operation.

We will now try the cracking operation once more, and see if we succeed as well as before. We have it now almost dry, it is dry in the middle, and will soon dry around the *edges*. I suppose that it is best, to make haste slowly, get rid of as much moisture as possible, and have less water to be converted into steam. Photography gives you a chance to dip into so many different branches of science. You see in all the processes the operation of the laws of physics. Optics

must have its share of attention, and chemistry seems needed to some extent. Now and then, you can have practical illustration of the laws of expansion and heat, when you break glasses as I did just now. (Applause.) It is rapidly drying now. I will now prepare another plate, and make a transparent positive, place it in the lantern, and throw the image on the screen. This is a smaller plate; the smaller it is, the easier it is flowed One two feet square would be quite an effort to flow. I now place this picture in this light frame, and secure it in place by one or two tacks. I will cover it over with a thin piece of paper. If I hold the light on this side, the paper will serve to disperse the light; if I placed it nearer, the light would be intense in spots. I want to diffuse the light. We have the camera arranged as in our former experiment, but I took the precaution to adjust the focus with a similar negative before you came this evening. The light will shine more readily through the transparent parts, of course, blackening the film around the figure. The figure is dark, and will obstruct the rays of actinism; but, of course, in this case the figure will be light, and the surroundings dark, the reverse of what you saw before. Now, we have the plate ready for exposure; place it in the camera in the same manner; now draw up the slide. In this case I do not use the portrait tube, but one of the celebrated Globe lenses intended for view work, and for copying drawings. They produce an accurate copy of the existing original; for instance, as the photographs of maps made with this lens, the copy will be as exact as the drawing itself. It is this lens which is the best for the purpose. I will now develop the plate after exposure, and see if we can find an image there. The same development is used in making as the former plate; now there it comes, nicely, just what we want. (Applause.) I shall clear it with cyanide; it is more violent in its action, and makes a rather clearer image. It is the substance I spoke of, and I said it was rather dangerous to use. There are laws passed, prohibiting the sale of arsenic, yet any child can go to an apothecary's shop, and buy an ounce of cyanide without any restriction, and it is ten times more deadly a poison. It is clearing now; the solution is not very strong; it seems to melt away the reduced iodides. From being a pearly looking film, it becomes a transparent one; it does not require so much washing as when hypo is used, as it is more soluble in water, and more readily removed from the film. Now, while the drying is going on, which will take but a moment, I will observe there are certain things necessary to keep the chemicals in a good condition. The pure solution of nitrate of silver will not blacken when exposed to light, but after the bath has been used for a good while, it will not work well, as there is mixed up with it alcohol and various organic compounds. To correct the bath, you should pour it into a transparent glass vessel, and add to it a little water. The water weakens the bath, and there is a precipitate of iodide of silver formed, which had been held in solution in the strong solution of silver, but is now no longer held by the weaker solution, and thus precipitates and falls to the bottom of the vessel. Then set the vessel containing the bath in the bright sunshine; allow it to remain there for a day or two. It will then begin to blacken. It is not the nitrate of silver; it is the organic matter. You can filter it then, and have your bath in a good working condition. If there should be too much alcohol in it, you can put it in an evaporating dish, and boil it down. Then add to it water sufficient, so that when you put this instrument, the hydrometer, in it, it will stand at 55°. Then it is renewed, and it is in its former condition. After you have taken your negative, to protect it you can cover it with varnish, so as to make the paper prints from it; the varnish is not put on with a brush, but flowed on exactly as the collodion was. I am now pouring the varnish on the surface, and allowing it to pass freely over it. Now it is covered with varnish, and the film is made fast. There is no danger of the film being scratched when in contact with the paper. If I should hold it too close to the light, the varnish would take fire, it being made of alcohol. I would suggest one precaution: in flowing with the collodion, be careful never to have the light burning below the plate, for the vapor of ether is heavy, and sinks down, and if the light is below, the whole will take fire.

There are many who have learned this by experience. We will now place the picture we have made in the lantern, and thus throw its image on the screen. You see how evenly it has been lighted; this is the result of the manner in which I lighted the statuette when making the negative. I will not tax your patience further this evening. At our next lecture we will consider the subject of photographic printing. We can print by magnesium light, as well as make negatives.

PHOTOGRAPHIC NOVELTIES OF GERMANY.

BERLIN, May 13, 1866.

DEAR SIR: I accept with pleasure your invitation to contribute to your well-edited and excellently conducted Journal, and I herewith send you my first communication on the "Photographic Novelties of Germany."

The extraordinary rage for speculation, with which photography was seized after the invention of the photographic carte-de-visite, has gradually become fainter and fainter, and is now about to vanish altogether. A crisis has arisen, and numberless speculators who understood nothing but the roughest mechanical manipulation, and possessed no idea of the artistic principles of photography, have fallen victims to it.

The public taste has, of late, considerably improved, and those only can at present hope to make their fortune by photography, who bring to bear upon it a genuine artistic feeling. Berlin stands at the head of all German cities in the cultivation of this æsthetical side of photography; I will not, however, maintain that all photographs here produced satisfy the claims of art. There are some few, such as Loescher & Petsch, Wigand, Milster, H. Graf, &c., who stand creditably prominent in this respect, and there are many others who endeavor to imitate these models, but without success.

There exist, at present, however, certain ephemeral photographic productions, which arise like meteors, create a general sensation in art, defy anew the passing rage for speculation, and then quickly disappear. To these belong the "magic photographs," invented by the clever chemist and photographer, Wilhelm Gruene. This wonder has lasted four weeks; already, the public is satiated, and the sale has been ruined by competition.

I give you the modus operandi for the production of this charming toy. Take an ordinary silver print on albumen paper, washed (but not toned), and fixed in pure hypo, and plunge it in a saturated solution of perchloride of mercury. The print will disappear, *i. e.*, changing the silver, forming its contour in chloride, and precipitating at the same time protochloride of mercury. You have in this manner a white image, containing chloride of silver and mercury. Wash it very well. Take a sheet of blotting-paper, plunge it in a hypo solution, and dry it. This sheet of blotting-paper forms the developer. It is covered over the invisible image, and water sprinkled on it. The hypo reacts on the chlorides of mercury and silver, forming brownish-black sulphides. The principle is not new. It was known fifteen years ago, and at first published by Herschel. What is new in Gruene's discovery is, that he introduced into trade, not a fluid as development, but a solid, as a piece of blotting-paper. There is, however, another very interesting and useful application of this principle, the removal of the brownish silver stains on the clothes of photographers. The best material for this purpose is cyanide of potassium, but after its application on cloth, very often yellow stains remain inextirpable; therefore, it is better to take for the removal of spots the perchloride of mercury, which will not destroy the color of the clothes, and removes the silver stains perfectly.

Compared with the immense trade in magic photographs, the employment of photographs of admired actresses, as ornaments for watches, bonbons, &c., appears rather insignificant; nevertheless, at the present moment a great business is being done with them. Lucca chocolate, Lucca watches, Lucca letter-weights, are now bought, and Herr Gruene is preparing even Lucca lamp-shades, imprinted with the likeness of our worshipped prima donna. Lucca gloves (with likenesses on leather) are being now made, and Lucca pocket-handkerchiefs will not long be wanting. I have already, myself, seen likenesses

on calico and silk produced by different photographers, and within a short time the young lover will have the image of his betrothed on his handkerchief, to the delight not only of his ocular, but likewise of his olfactory organ.

Let us now cast a glance at the public market within the studio. You have already given an account of the new wide angle lenses, Steinheil's periscopes and Busch's pantoscope lenses, which compass an angle of 90° and more, with a perfectly correct outline, and which, according to the opinion of my highly esteemed friend, M. Carey Lea, effect rather too much, than too little. It is true that these lenses have a greater field of view than the eye at one time is capable of surveying, and, consequently, that the views taken with them appear at first sight exaggerated in the perspective. But if, for instance, the building be taken from the front side, this fault is not observable; and thus by means of these new lenses, photographs may be taken under circumstances in which the old lens would be quite useless. I have, lately, made a series of experiments with these lenses, and have proved the astonishing effectiveness of them.

The actinic power is, of course, only trifling; the focussing has, therefore, its difficulties, and requires an experienced eye. The unusual angle of view was shown best from the fact, that four plates were sufficient to take the panorama of Berlin from the roof of the Polytechnic Institution. Remarkable is the depth of focus of these lenses. In the photographs above mentioned, the remote objects appear quite as sharp as the horizon, and even the support of the camera, 20 square inches in surface, was visible in the picture with considerable sharpness.

An important element, in the use of the pantoscope lenses, is the strength of light, which diminishes towards the edges very considerably, and it is clear that, in consequence of this, the border will be under-exposed, when the middle has been sufficiently exposed. My friend, Remelé, the excellent photographer of Mr. Beyrich's establishment, therefore, allowed the edges to be longer exposed, while he covered the angle of view in the middle, and was successful. He held, after a certain time, a round, black piece of pasteboard, about two inches in diameter, on a wire before the lens, and thereby covering the middle part of the image. One should hold the pasteboard about half the length of focus from the lens. I have not employed this arrangement with smaller plates, but have avoided the defect by letting the developer work more on the edges than on the central part of the plate. The time of exposure is, in sunshine in winter months, one minute; now (in the spring months) one-fourth to a half minute is sufficient.

A disagreeable failure of this lens is the white spot of light, which appears, also, in the use of Globe lenses. I have found in my experiments, that this spot only appeared when the sun shone on the stop. Like the sun itself act also very bright clouds, &c. Therefore, it is necessary, in all experiments "against the sun," to protect the instrument, as much as possible, from the light pouring in from above. Perhaps you would like to know which is better, the periscope or pantoscope lens.

A committee elected by the Photographic Society, have tried the two lenses, and have found that the larger specimens of the periscope have not the large angle of view of the pantoscope. In the small sizes of both sorts of these lenses, the angle of view is the same, but the actinic power is a little higher in the pantoscope. But all the periscopes have a very disagreeable failure, and that is the chemical focus. It was at first impossible to secure a sharp image with the periscope lens, and much experiment was necessary to search the "point of the best sharpness" of each lens. In the circulars of Messrs. Voigtlander and Steinheil, you will see an index for correcting the chemical focus after focussing, but the numbers printed in this index are not right for all specimens of the lenses, and therefore, also, the committee for trying the lenses have not succeeded in using them. F. E. Voigtlander recommends for the No. 2 periscopic lens after focussing to approach the lens to the focussing-screen, about 6 millimetres, but I have found that this is not right; the specimen of No. 2 periscopic lens gave a sharp picture after an approachment of 4 millimetres.

Therefore, I believe that the pantoscopic

lens, which has not a chemical focus, is to be preferred for the practical photographer.

In one of the last meetings of the Photographic Society, Mr. Grashoff read an interesting paper on "Retouching Negatives."

We have, in Germany, some excellent artists, who have no equal in touching up the negative, and the most eminent of them is Mr. Rabending in Vienna. The material employed by him is very simple. It is a soft lead pencil, and that in simple application on the varnished plate. I have tried this method of retouching, and find it very easy and successful. It is possible, in this manner, to correct the finest lines of the images, to drawing clouds and others.

A certain skilfulness, however, is always necessary for this easy method, especially in fixing of the light, but one can very soon and easily make himself thoroughly acquainted with the work, since it is always easier to work with pencils, than with brush and colors.

Mr. Grashoff recommends, also, for parts to be very strongly retouched, the "oil chalk" (creta polycolor), but I find this not so good in application. There are, in the practice of photography, remedies recommended very often, and used a long time without any objection, though the real action of such remedies are never appointed exactly. In this manner our German photographers have for years employed the carbonate of lime for the neutralization of the acid silver baths, and it appears to be regarded as a fact, that the carbonate of lime exercises no pernicious effect on the silver baths. That is a mistake.

I took a solution of silver, determined exactly its contents with my silver solution tester; it amounted to 8.6 per cent. I then shook the whole (about 40 cubic cent.) with 1.1 grain ground carbonate of lime, and let the whole stand for twenty-four hours. Afterwards I tested the solution again as to its amount of silver, and found that it contained now only 2.1 per cent. The experiment was repeated, and a 5 per cent. solution of silver, shaken for three minutes with carbonate of lime. The silver contents sank to 0.7 per cent. If chalk is added only in small quantities, the loss is not so important. Yet the question remains, whether through the shaking with chalk the chief aim is attained, namely, the neutralization of the bath. If the acid is acetic acid, this is, perhaps, the câse, though acetic acid is neutralized very slowly by the chalk. But this is not the case, if the bath contains free nitric acid. Here nitrate of lime is formed, and this in no way reacts as neutral, as many may think, but as acid, even when it has been boiled with an excess of chalk. The neutralization of the silver baths is, therefore, much better attained by employing carbonate of sodium. Take a solution of it, and add some drops of it to the bath, till, by the shaking, a remaining weak precipitate arises, and then filter. Other photographers recommend oxide of silver and carbonate of silver for the neutralization of the bath, but these are not practical, inasmuch as their action is very slow.

Your excellent contributor, my friend M. Carey Lea, some time ago, had spoken of the aniline printing process of Mr. Willis, and called it one of the most interesting printing processes found in the past year. Therefore, I hope that a short description of my experiments, in connection with this process, will be interesting to your readers. I give you my experiences with it in a separate paper inclosed.

Yours, truly,

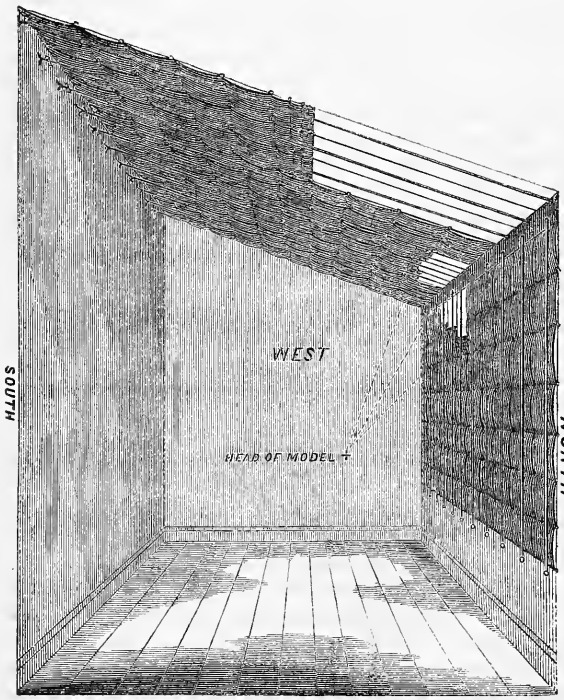
DR. H. VOGEL.

MORE ABOUT SKYLIGHTS.

WE have so frequently spoken of the charming pictures sent to us by Messrs. Loescher & Petsch, of Berlin, Prussia, and as they have been so much admired on account of the very superior manner in which the models are lighted, we concluded that we could not go amiss in publishing a drawing of their *atelier*, and one of their pictures with this issue of our Journal. These gentlemen have kindly given us their aid in this matter, and with the help of our engraver, and the letter of Messrs. Loescher & Petsch given below, we think our readers can very well understand the plan and management of this excellent arrangement. They write:

"It is self-evident, that with a light as much concentrated as possible, emanating

from a small opening, we obtain the best modulated heads, but in such a picture the contrasts will always be too sharp and hard, and particularly will the surroundings suffer from want of half shade, while the whole picture lacks fineness; if, on the other hand, we employ a much dispersed light, we will obtain sufficient half shade for the surroundings, but the picture will need vigor of contrast, and in consequence, effect. Our aim, therefore, must be to combine the two methods of illumination in such a manner as to preserve the vigor of contrasts of the first, while at the same time we retain the beauty of the half shades of the second method. We believe that our way of illuminating solves this problem, and upon the above principles we have based the construction of our atelier.



"The room is forty feet long by twenty feet in width; the highest wall is about sixteen feet high; the lowest one, about eleven feet. The roof inclines towards the north; the side walls face east and west. In the construction of our glass-house we aimed to obtain a pure northern light. The side-walls were, therefore, closed up entirely, and the roof and the front facing north were covered with good white glass. In order to protect ourselves against the disturbing influence of the sun, we placed a large sunshade on the roof. Having thus obtained a pure steady light, we proceeded next to the inner arrangements, which should enable us to arrange the light in the simplest manner upon artistic principles, while at the same time we could select for every head the illumination most suitable for it. To do this, it is necessary that the light should strike the model from any desired and suitable point, and *from this point only.* (This cannot be done in the atelier of Mr. Wenderoth; he can give light from above, or side-light or front light, but the combinations are not possible without giving an excess of light.) Our top light is shaded with one and a half feet wide curtains of doubled blue muslin, and in the same way we cover the glass front to the north. The curtains run on strong wires which are well fastened on both sides of the room. To prevent light from passing directly through the interstices of the curtains, we let them overlap each other like shingles on a roof, sufficiently far apart to prevent friction. In the same manner the side curtains are fixed, the strings of which are held by curtain fastenings in such a manner that they remain stationary in any position, notwithstanding their weight. Every curtain of the roof has its separate strings, which, through rings, are carried down the side wall. This arrangement enables the photographer to produce any effect of light he may desire.

"The application of the above advantages, by means of which we obtain vigorous effects without detracting from the delivery of modulation or tone, we will now attempt to describe.

"The third part of the atelier on the side of the model remains closed by means of the cur-

tains, while the other curtains, in accordance with the intensity of light, are on an average about one half opened; the model, therefore, is in a half shade, and, taken in this way, would give a picture without effect; we throw, therefore, into this half-shaded space a quantity of light on the head of the model, by opening a few feet of top or side curtains. This has a surprising effect. It illuminates the form with much precision and roundness, while at the same time the deeper shadows are easily removed by the front light. In this way, by means of a few widths of curtain, the light is under perfect control, and according to the peculiarities of the features of the model, more top or side light can be given, and with older persons more front light can be employed. With grown persons we prefer to give longer exposure, although we can work very rapidly as our children's pictures illustrate."

There can be no doubt but what the plan described is a most excellent one. The pictures of children alluded to above, and by us in another connection, prove how quickly the light may be made to work. The beautiful effect of light shown in them, and in a number of pictures of older persons in our possession, is most desirable and elegant.

As will have been already noticed, this method is different from any we have before described. The whole northern exposure, top and end, is glazed, while in most of our lights it is different. We know of but one light constructed in a similar manner, and that is without any of the curtain appendages described above.

Our readers can see how excellent this arrangement must be. We wish they could all see the beautiful specimens we have which accompanied this description. We very seldom enjoy such a real treat as they have given us. We can only present one of them to our readers, though it is not exactly every-day style. It is quite appropriate to the present season, and shows that this kind of picture may be made in this excellent light as well as ordinary every-day portrait work.

Now, we have still another model, which is, as will be seen, spoken very highly of by our excellent contemporary, the British Journal. We copy the following description and drawing from that Journal. The studio described is one recently constructed by M. Silvy, whose work is famed abroad. M. Silvy had formerly worked for many years a sloping roof studio, but found that the light was so unmanageable in summer-time that he had to cease working for two or three hours each day. We are not told what the construction of that light was, but that objection cannot certainly be made to the studio described in our last issue, or to the one described above.

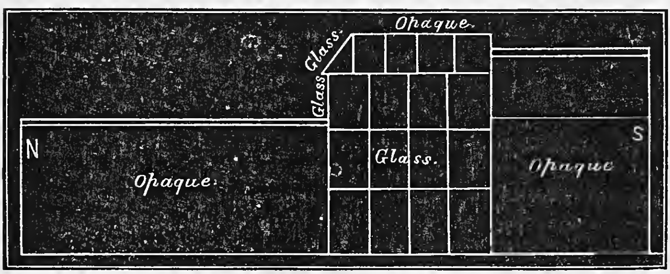
"The present studio is built on the space occupied by the former one, and covers nearly the whole of the roof of a house situated in an open position. The longitudinal aspect is as nearly as possible due north and south, the sitter, of course, being placed at the south end. The total length is over forty feet, and the greatest breadth is twenty feet, which is continued from the south end for a little more than twenty feet, or half the length of the studio. The height of the whole of this end is about fourteen feet, and the flat roof extends for from twelve to sixteen feet from the usual positions occupied by the sitters. The north end of the studio is narrowed, so as to allow for convenient operating-rooms on both sides, and the roof is also lowered, to give facility for the admission of more front light when deemed necessary.

"The arrangements for lighting and shading the sitter are thus managed. For the space of ten feet from the south wall the glass of both sides and the roof is rendered opaque. This long space allows of considerable latitude in placing the sitter or background farther from or nearer to the light, as circumstances may require. The next longitudinal ten feet on both sides consist of clear glass reaching from the floor to somewhat over ten feet in height—the glass on each side being parallel with the general direction of the studio, *and the flat roof being opaque.* Both these dominant lights, however, are never used at the same time. In the forenoon the eastern light is shut off by a patent roller shutter let down *outside* the window, and the principal light is allowed to fall from the other side. In the afternoon the other window is closed by

a similar arrangement, and only east and northeast light admitted.

"Practically it is by this arrangement that nearly the whole light is obtained, and as the glass reaches to a considerable height and breadth, it not only serves for side, but in most instances for front and top light as well. There is, however, another arrangement for the admission of more high front light when required, and it is managed in this way: The flat and lofty opaque roof over the sitter terminates from ten to eighteen feet in advance (the space varying according to the position in which he is placed), and slopes downwards two or three feet to a lower roof, forming an opaque covering to what may be called the shady portion of the studio, the slope being also carried down to the top of the glass sides on the east and west. This sloping part is glazed, and admits a subsidiary top front light and top side light. Real top light there is none, except in so far as it may be obtained by this and the height of the side lights already described. These lights may, of course, be shaded when necessary.

"Perhaps the following rough diagram of a longitudinal section of the essential parts of the studio will serve to make our remarks more clear:



"A week or two since we mentioned cursorily that this ingeniously-worked-out arrangement by M. Silvy appeared to be an enlargement of the system adopted by Mr. Rejlander in his studio. On more close examination we find there are only one or two little points of difference between them. In Mr. Rejlander's studio the plane of the glass which admits the side light is not parallel with the line representing the longitudinal axis of the building, but is inclined towards the sitter at an angle of 45° or thereabouts, whereas in M. Silvy's the glass is placed parallel with this same line. And, again, Mr. Rejlander's studio, from circumstances which he could not control, is glazed only on one side. This limits its capabilities considerably, and, worst of all, compels him to direct the principal light on only one side of the sitter, whether that be the best point of view or not.

"From the foregoing description it will be seen that, in the main features of the mode of illumination, M. Silvy's new studio is constructed on what has been generally called the 'tunnel system'—a system which, if carried out with judgment, we consider superior to all others. But it would be a great mistake to suppose, because of its being called 'tunnel,' that the room is a gloomy dungeon. On the contrary, the impression one receives on entering it is that of walking into an elegant reception-room, to which, indeed, from the character of its furniture, &c., it bears a greater resemblance than to the dazzling and oppressive glass houses we so often meet with. By a peculiar and elaborate arrangement, which space will not here allow us to describe, ventilation is provided for in a very complete and perfect manner—so much so, that it is reasonably inferred the temperance will not exceed 70°, or at the most 80°, during the hottest summer days. The operating rooms, too, have received the same careful attention, being both spacious and well ventilated.

"But the real test of efficient lighting of any studio is the character of the work performed in it, and this, we have no hesitation in saying, after comparing a multitude of pictures in the washing-tub with others taken by the same artist in the old glass house, is superior in respect of lighting. Another great advantage in the new arrangement which we have described, consists in the fact that the light can be so managed as to give effective illumination at all times of the day. Further: the shady aspect of the studio in front of the sitter en-

tirely relieves him from that painful sensation and expression of countenance induced by a strong glare of light falling on the eye. In short, we consider M. Silvy's the best model of a studio we have ever seen, although even in it there may yet be found some room for improvement."

As we have not seen the workings of a light constructed on the "tunnel" principle, we cannot fully indorse our contemporary's opinion thereof. If M. Silvy makes good work in it, it must be good, and we must say that the plan seems an excellent one. It will be much more convenient to erect such a studio in some places than it would the sloping roof style, and should any of our subscribers adopt the plan, we should be thankful to see specimens of their work made in it.

The model is, as will be perceived, illuminated from the side, and from above sideways; front light and direct light from above has been entirely avoided. Mr. Rejlander considers it an advantage that there are no window bars, as well for the model as for the resulting picture. These bars cause a painful sensation in the eye, by which the natural expression is disturbed, and the beauty of the eye is lost in the picture. The apparatus is entirely in the dark, and the operator can focus without a cloth. The eye of the model looks into the dark, the pupil of the eye becomes dilated, and the eye gains depth and expression. Nothing disturbs more in a photographic portrait than the light, glassy, expressionless eye, which results when the model looks toward the light; in this case the pupil of the eye contracts, and if the natural color is blue or gray, it will appear in the portrait fishlike, washed, and expressionless, while in the original it is perhaps dark, clear and full of expression.

The subject of skylights is almost inexhaustible, but we have endeavored, in our papers thereon, to give such hints as were really practicable and useful, and it gives us pleasure to know that already our advice has met with favor, and been followed.

For our next issue we shall prepare a paper upon the way the sitter should be lighted, and some other hints upon the management of light inside of the studio after it has been constructed.

We have written to Messrs. Loescher & Petsch for their working formulæ, and hope to receive it in time for insertion this month. Should it not arrive in time, our friends will bear with us another month, we feel assured.

In our next we hope to publish a portrait by Mr. William Notman, of Montreal, Canada, with a diagram of his regular portrait atelier.

IMPROVED APPARATUS FOR OUT-DOOR WORK.

Patented June 19, 1866, by Dr. C. A. Leech.

NOTWITHSTANDING the numerous attempts, both in this country and in Europe, to dispense with the uncertain and troublesome dry process, it is believed that hitherto the desideratum of a certain, simple, and portable apparatus by which a negative could be taken in the open air with the same facility as in the atelier, and with the same perfectness, had not been attained.

The following is a description of an apparatus, designed to meet this want, the invention of the patentee, Dr. C. A. Leech of our city, which combines in itself all that is required by the amateur or photographic artist, as it may be carried with the same ease as a travelling-bag. Fig. 1

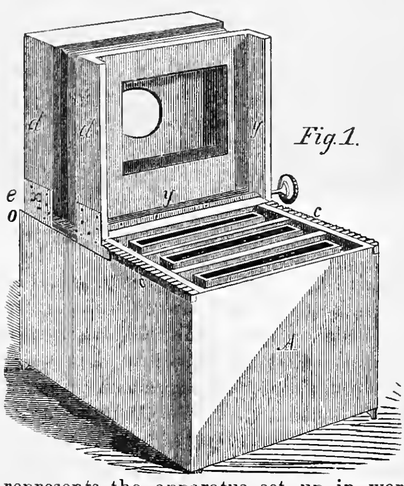
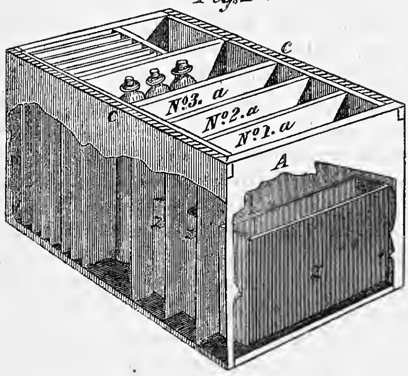


Fig. 1.

represents the apparatus set up in working order without the tripod, which is at-

tached to the bearings at the lower corners of the box, A. The whole apparatus consists, as is seen in the figure, of a light box, less than a square foot in size, separated into compartments by vertical partitions, *a*, *a*, *a* (Fig 2). Within three of these compart-

Fig. 2.



ments upon the bottom of the box, A (Figs. 1 and 2), are sinks or cells, *z*, *z*, *z* (Fig. 2), made to receive the baths (Fig. 4), three in number, containing, 1st, the silver solution; 2d, the developer, and, 3d, the wash. The baths are capable of being lifted out at pleasure for purposes of cleaning, &c. Upon the upper lateral edges of box, A (Figs. 1 and 2), are metal ratchet pieces on each side, *c*, *c*, upon which work pinions with milled heads, attached to the camera frames, *d*, *d′*, which are moved back and forth like the ordinary camera. The front frame of the camera, *d*, is held firmly in place by the pins, *e*, on each side, passing through the guiding clamps, *x*, at the sides of the frames. The back of the camera frame, *d′*, is movable by the milled head and pinion upon the ratchet work, *c*, *c*. on the edges of the box, A, and is arranged with sides and base, *y*, to receive the dark box or plateholder, B (Fig. 3), which is held in place by a catch, T, on the upper side of the box, B. Fig. 3 represents the dark-box or plateholder. It consists of a box, a little larger than the plate, closed on one side by the sliding-door, *f*, having an orange glass window, and on the other side by the shutter, *f′*. Within the box, B, at the top is a cross piece, having a hard rubber frame, *g*, *g*, *g*, attached, of the size of the plate to be used, and having corners like the plateholder of the ordinary camera, for the support of the corners of the plate when in position, which it

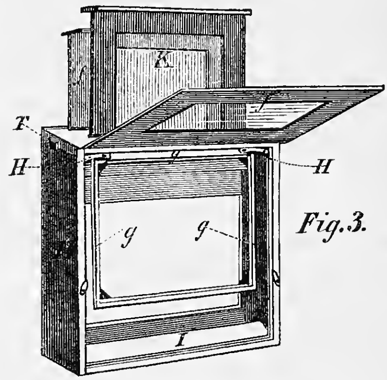
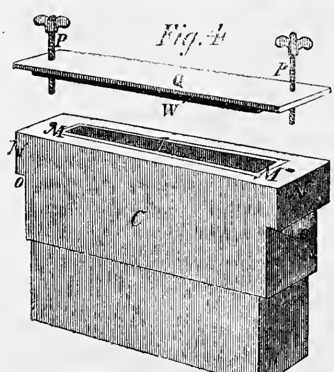


Fig. 3.

holds perfectly vertical and steady, by means of the pressure upon the upper corners of the plate, of the springs, H, H. Set in at the top of the box, B, is a slot, guarded by the usual spring valve, against the entrance of light, for the reception of the ground glass slide, K (Fig. 3). This focussing glass slides down within the frame, *g*, *g*, *g*, so as to be in the same position as the plate, thus insuring perfect accuracy of focussing. At the bottom of the plateholder, B, is a valve of rubber, I, hinged on rubber, and opening inward, which, when falling in place by its own weight over the projecting edges of the box left for this purpose, it excludes all light in that direction.

C (Fig. 4) is the form of the bath, made

Fig. 4.



from ordinary hard rubber for lightness, and so modelled as to fit into the sinks, Z, Z, in the bottom of the box, A (Figs. 1 and 2). The top of the bath is closed by a hard rub-

ber valve, L, opening inwardly, and held tightly closed by india-rubber springs, at M M, thus permitting no escape of solutions during use, or the entrance of dust or light from without. The corners of the upper part of the bath have projecting flanges, N N, perforated with a hole, and having, on their under surfaces, a screw piece, *o*, to receive the binding screws, P, P′, which press down the lids or covers of the baths, Q, accurately over the raised edges of the mouth of the bath, when not in use. For this purpose the lids are furnished with a strip of india-rubber on their under surfaces, W.

The mode of operating the apparatus is as follows: The bath box, A (Figs. 1 and 2), is set upon the tripod; the camera frame, *d*, *d′*, is then slid in place upon the ratchet pieces, *c*, *c′*, the front part of the frame being secured by the pins, *e*, *e′*. The camera being then directed to the object, the plateholder, B (Fig. 3), having ground glass, K, in place, resting in the frame, *g*, *g*, is then placed upon the back of the frame, *d′*, and fastened by the catch, T. The focus being then obtained, the ground glass is removed, and the coated plate placed in the frame, *g*, *g*, being held by the springs, H, H′, at the top, with its coated side opposite the lens; the sliding door, *f*, is then closed together with the shutter, *f′*, and the plate is completely excluded from the actinic rays by the valve, I, closing up the bottom of the plateholder.

The plateholder, B (Fig. 3), is then slid down in the compartment No. 1 of the box, A (Fig. 2), occupied by the bath containing silver solution, which bath is thus caused to enter the plate-box, pushing before it the valve, I, and the plate suspended in the frame, *g*, *g*, is lowered into the bath, in its passage downwards, pushing open the valve, L (Fig. 4), closing the mouth of the bath. The valve slides over the back of the plate, and does not come into contact with the collodion film. The plateholder is then raised at times to watch the process of sensitizing through the orange glass windows. When it is complete, the plate-box, B, is raised slowly, and as the valve, L, of the mouth of the bath is closely applied to the back of the rising plate, it is almost completely drained of superfluous fluid, leaving none to drip into the plate-box. As the plate-holder leaves the bath, the valve, I, released from the pressure of the side of the bath, falls into its place, excluding the light completely. The plate being now sensitized, the holder is transferred to the back of the camera frame, *d′*, as before in focussing, and the slide, *f*, being raised, the plate is exposed to the actinic influence, after which the slide, *f*, being closed, the holder is slid in the same manner as in sensitizing, over the bath in compartment No. 2 (Fig. 2), containing developer, and the same series of actions are repeated as at first, the development being watched through the windows at leisure. After development the plateholder is slid again into the compartment No. 3 of box, A, containing water, and is thus cleansed from developer. The door, *f′*, being now opened, the plate is easily released from the frame, and the picture may be fixed in the open air, by the hyposulphite contained in the bottle, found in one of the other compartments.

Thus it will be seen that the whole performance of this apparatus is very much the same as that carried on in the skylight, but without the inconveniences. The manipulation being perfectly automatic, the fingers are not even soiled, and the streaks and blotches on the plate are avoided, from there being no stoppages in development or sensitizing, and moreover the results are certain.

The apparatus of the dimensions above described will take pictures $6\frac{1}{2} \times 8\frac{1}{2}$, and for larger ones, the baths must be made larger. It carries also a dozen clean plates, two lenses, an 8 oz. bottle of collodion, same size bottle of hyposulphite, alcohol, silver, and other chemicals, together with articles for cleaning the plates, and all inclosed in a neat canvas bag, a little more than a foot square, when packed for travelling.

For further particulars, the inventor, C. A. Leech, M.D., can be addressed at 1339 Coates Street, Philadelphia, Pa.

To E. M., Columbia, Tenn.—You had better make shorter exposures, and re-develop with pyro-gallic acid.

Please remit for your subscription.

GOVERNMENT PHOTOGRAPHY.

WHILE in Washington, a few days ago, we made it a point to visit the departments wherein our art is employed by the Government. We have before alluded to the fact that photography was of great use during the late unhappy war, in many ways, and that the Government still employs a number of skilled artists for various purposes.

At the Army Medical Museum the photographic manipulations are under the superintendence of Mr. Wm. Bell. A nicely arranged and convenient *atelier* adjoins the Museum, and all the conveniences of a well-regulated, first-floor gallery are there. Though many portraits of our distinguished men are made there while on a hasty visit to Washington, the principal work of the photographer is to photograph shattered bones, broken skulls, and living subjects, before and after surgical operations have been performed upon them. Of course, all these subjects were created by the war. In most cases the fatal ball is plainly visible in the bone that it had caused to be shattered and broken, and quite an interesting descriptive paper could be made upon the subject, if the effort were made by our friend Dr. Towler, but we are unequal to the task. These bones are photographed principally to aid the engraver in making wood-cuts for the illustration of works upon army surgery. We were shown some photographs of the wounded, before and after operations had been performed upon them, and certainly photography is the only medium by which surgery could so plainly make known its handiwork. We saw a picture of one poor fellow as he came from the field, with his face almost torn asunder by a shell. After surgery had exercised its skill upon him, he was again photographed, and looked much better than any one could be expected to look with his lower jaw gone. We passed hastily through the Museum of mounted bones and shattered limbs, and next called upon our friend Mr. L. E. Walker, photographer to the Treasury Department. Mr. Walker's work is more general than that of Mr. Bell, and covers both architecture, landscape, and portraiture, as his orders may be, though his chief labors are in enlarging and reducing for the Note department. We have before spoken of his pictures of the Capitol buildings.

He is also supplied with a very nice *atelier* and all the necessary accessories, and very convenient rooms for the various branches of the art.

Mr. Bell has recently been photographing the late battle-fields in Virginia, and has secured some very interesting negatives (historically). Quite a number of the surgeons who lately served in the hospitals at Washington are amateur photographers. No more convincing argument could be given to the Finance Committee of the Senate in favor of Photography as an aid to science and art than the manipulations practised for the Government itself.

Our next visit was to Titian R. Peale, Esq., Chief Examiner at the Patent Office. Mr. Peale has special charge of all photographic applications for patents, and having been in the office over seventeen years, and being himself a skilled amateur, has a better knowledge of the history of photography here and abroad than any person living. Being an enthusiastic lover of the art, and desirous of promoting its interests wherever he possibly can, photographic inventors may always feel assured of justice being done in his hands. He has a library of photographic books which overwhelmed us to look at. We only regretted that we had not the time to make a list of them for publication, but hope to do so at some future time, as it would no doubt be interesting. All the photographic journals and publications, at home and abroad, are ordered for the use of the office.

So numerous are the applications for photographic patents that Mr. Peale has been forced to classify them. In doing this, he has already filled three great volumes with drawings and descriptions of apparatus and processes. These he has arranged, as we have said, into different classes, such as "Optics," "Solar Cameras," "Collodions," "Sensitizers," "Developers," "Papers," &c.

We now know where to go to find any reliable information concerning our art. We hope, at some future time, to accept Mr. Peale's kind invitation to spend the day with him. If we are spared to do so, we shall be able to tell our readers much more about the cosy

quarters of the Chief Examiner of the Photographic Department of the Patent Office. As we went to Washington in obedience to a sudden call, for the special purpose of looking after the interests of our subscribers in the revenue tax bill, we were in much haste to return and get our number for July out in time, and, therefore, could not spend as much time as we desired at either of the places spoken of. If our Finance Committee had been with us, we are sure they would have placed Photography upon the free list.

PHOTOGRAPHING ON WOOD.

One of the most useful and wonderful appliances of our ever-growing art, is that of photographing upon wood. It is found to be an invaluable helper to the publishers of our various illustrated newspapers, and particularly when an engraving is needed in haste, and the time occupied by the artist in drawing the design upon the block would be an actual loss. This was particularly the case during the war, when receiving drawings from the artists in the field; all the time that would have been occupied in transferring them in the usual way was saved by simply making a reversed negative from them, and printing the copy directly upon the block of wood.

Mr. Frank Leslie, of New York, whose fame as a publisher is world-wide, has felt the importance of this branch of photography in his business, and has set apart a suitable portion of his immense building for photographing on wood, under the charge of Mr. J. Wright, an old experienced photographer, well known to some of our readers. The superiority of the illustrations in his weekly newspaper over those in other periodicals is, in many cases, owing to the help of photography.

If it is desired to present a portrait of some distinguished individual, and it is not possible for the person to come and sit for his picture, then a reliable photograph is procured, tacked to the copying board, copied, and printed on wood. Each line and feature is then easily produced by the engraver with all the truthfulness of a sun-picture. It is so with fashion plates, landscapes, buildings, &c. &c. Probably many of our readers have noticed pictures of a number of public buildings and places in the different cities, published recently in Mr. Leslie's Weekly newspaper. These are all copied from actual photographs, and reproduced without a touch from the artist's pencil. To secure these, Mr. Leslie employs the services of the most competent photographers in each city to make the negatives, who may always be found on hand with their cameras on all interesting occasions, and often in the streets, making pictures of public buildings, &c. &c.

By invitation of Hon. E. George Squier, Mr. Leslie's editor in chief, we visited the mammoth establishment at the corner of Pearl and Elm Streets, New York. We passed through the store, artists', compositors', press, folding, and other rooms, until at the top of the house we found the photographic department, and Mr. Wright hard at work. Through his courtesy we were enabled to see the workings of his processes, and to present his formula to our readers, below.

The accompanying illustration is a reduced copy of an engraving published in the London News; reproduced to its present size by photography in the columns of Frank Leslie's Illustrated Newspaper. Its original size was $6\frac{1}{4}$ inches by $4\frac{5}{8}$, and would have

taken an artist an entire day to reduce and redraw it by hand. By the use of photography, it was reduced, printed ou the wood, and engraved in seven hours, every feature and line being as accurately preserved as in the original.

Those who desire to try to photograph on wood, will, in the beginning, recollect that more depends upon care and cleanliness than upon the details of the process. They are very easy to make, if this fact be borne in mind, and carefully practised. The negatives are made in the usual way, except that they are reversed by the use of an extra glass. This is done in order to make the impression from the wood-cut appear properly.

To prepare the blocks, which are, of course, box-wood, such as is commonly used by engravers, saturate them in melted white wax, permitting them to remain in it a few seconds only. Scrape the wax off the block with a scraper, clean the surface with turpentine, and coat it with flake white in the way practised by engravers. This is done merely to give the block a white surface, and to make it more easy to watch the printing as it progresses. The block is then flowed with a solution of water 3 parts, albumen 3 parts, and salt 3 grains to the ounce of water and albumen. It is then dried, and with a piece of paper a second solution is spread over the surface of the block, of silver, 15 grains to the ounce of water, glacial acetic acid, 2 drops to the ounce, and just enough gelatine to give the solution the consistency of oil. After again drying the block thoroughly, fume it about fifteen minutes, and print in the usual way. After printing, the blocks are treated almost exactly as paper prints. They are toned, as follows: Dissolve 45 grains of hyposulphite of soda in 32 oz. water, then dissolve 15 grains chloride of gold in 16 oz. water, and add it, little by little, to the hypo solution. Shake well, and when the mixture becomes clear as water, it is ready for use. Fix with hypo soda. By this simple and easy process, quite a revulsion is being made in wood-cutting, much to the improvement of the pictures.

Save a revenue stamp.

PEROXIDE OF HYDROGEN.

As the use of peroxide of hydrogen for eliminating hyposulphite of soda seems to be exciting the fraternity at present, I beg to state that I have used it as far back as the spring of 1863. My experiments were not extended to a large number of trials, but were made simply on a batch of prints which were apparently totally destroyed by a long immersion in a weak solution of hypo, during which time being exposed to diffused light, caused a formation of sulphide of silver, so great that hypo at saturation did not prove successful in removing any trace of this yellow color, which the sulphide of silver had imparted. Finding my prints all lost, I therefore instituted a number of experiments. All were useless, except a weak solution of peroxide of hydrogen, that I had remaining from a series of experiments made, in connection with the salts of alumina and lead, for the purpose of producing instantaneous pictures. This seemed to remove the yellow stains after an immersion of about ten minutes.

The use of peroxide of hydrogen was not limited to that experiment. I also used it on oil portraits, for the purpose of copying them with greater facility. That is, by transforming the black sulphide of lead into a white sulphate of the same, or, in other words, oxidizing the former, and thereby rendering the picture clearer and whiter, and also never forgetting to moisten its surface with clean water, half a minute previous to making its copy. The latter has been published since.

I will here give the cheapest mode of preparing the peroxide of hydrogen with its reaction,—by passing a current of carbonic acid gas through water, having bioxide of barium in suspension. Thus the reaction

BaO_2+Bioxide of barium. CO_2+Carbonic acid. HO. Water.

Forming

$BaO.CO_2$ Carbonate of baryta.+HO_2 Bioxide of hydrogen.

Yours, truly,

A. J. De Morat,

Eighth and Arch Streets, Philadelphia.

A few copies of Photographic Mosaics and Newman's Manual left.

DEATH OF THE STAMP NUISANCE.

On a little slip attached to our last issue, just as we were about to go to the binder, we announced that our delegation had succeeded in their efforts to induce the "Committee on Ways and Means" of Congress to report in our favor so far as to relieve us of the intolerable nuisance of sticking stamps upon photographs, and substituting therefor a tax, *ad valorem*, of five per cent. The report of the committee was objected to by the chairman, Mr. Morrill, who was ably opposed by one of our Philadelphia Congressmen, Leonard Myers, Esq. The report was finally carried, and, so far as Congress was concerned, became a law.

Hoping to do still better, however, with a representative of the New York delegation, we visited the "Finance Committee" of the Senate on the 14th inst., and tried to show them why there should be a further reduction in the tax upon photographs, and that they should even be free. In this, we have not succeeded. The matter has passed the Senate, and five per cent. tax, *ad valorem*, and no stamps, is the law, to take effect July 1st, we believe. *Plain* photographs only are taxed. We have much to congratulate ourselves upon. The stamp nuisance is dead, and the tax very much reduced. For this, photographers are indebted to the efforts of the delegation, to Leonard Myers, Esq., to B. Van Riper, Esq., U. S. Senate, and to those who gave time, money, correspondence, and hard labor to the cause. The delegation and the craft are particularly indebted to Mr. G. H. Loomis, of Boston, who made every sacrifice to gain his point.

NOTICE TO SUBSCRIBERS.

We are informed that a number of subscribers are feeling sorely about the position we have assumed respecting the "Cutting Bromide Patent." Our readers hardly need be told that we gave them all the evidence we could possibly collect that would bear *against* the patent, leaving them to judge what would be best to do in the matter.

Although entirely against our own feelings, after investigating the evidence thoroughly, we could not help but advise our readers to submit to the patentee's claims. All our contemporaries did likewise, independently of us, and without consultation with us.

We need only add, that no overture was ever made to us by any one in consideration for any part we have taken, or might take, in the matter; neither have we received, or do we expect to receive, any sum whatever for what we have done. A careful reading of our papers upon the subject, ought to convince any one that our desire was to look after the best interests of our subscribers only, as we have ever done.

MAGIC PHOTOGRAPHS.

Quite an excitement has been prevailing since our last number was issued, over the Magic Photographs, the process for making which we first published in this country on page 185 of that number. We, with the rest, have been making them, and have had much pleasure in showing them to many. Prof. Towler has written a little book on the subject. Wilson & Hood, of our city, and Faris, of New York, are offering them for sale in neat packages, and are selling thousands of them. All sorts of advertisements are to be seen in the papers about them. Some call it *photoprestigiation*, others, *aqua-mirabilisographictrickography*, &c., &c.

The dealers tell all sorts of stories about those who call upon them to see what the Magic Photographs are. Many expect that with a few drops of water they may make any photograph they desire.

Were the matter worth a discussion, we should find fault with the process published in his little book by Dr. Towler, but will only state our own process, which requires the least trouble, and does not require to be done in the dark-room.

The prints are made in the usual way, but should only be printed until they have the appearance of toned prints—that is, not so strong as usual. After printing, wash, and fix them in hyposulphite of soda of the usual strength, wash them well again, dry them, and cut them out. Then immerse them in a saturated solution of bichloride of mercury, of the strength of 1 ounce to 40 ounces

of water, until they appear entirely white and faded. After this, they should be thoroughly washed again. Pieces of blotting-paper, soaked in a separate solution of hyposulphite of soda, placed upon these prints and wet, cause the prints to reappear with all their former vigor. A wash of three or four hours, in changing water, will secure prints as permanent as many that are sold now-a-days, and not of an unpleasant tone.

Neither of these operations need be done in the dark entirely, except the fixing. Much amusing entertainment may be derived in this way, though the older disciples of Daguerre will remember that the trick is nothing very new after all.

OUR PICTURE.

Our illustration this month tells its own story. It represents a scene that, at the present time, may be daily witnessed in many parts of our country, and not very far from this city of fashion. We have had the prints ready for use for some months, but have been withholding them for a more appropriate season, which is the present.

Were it not for the third party, and were the masculine individual a little older-looking, we might call it a picture of Boaz and Ruth, and imagine the persuasive old fellow, deep in love, saying, as did Boaz of old, "Hearest thou not, my daughter? Go not to glean in another field, neither go from hence, but abide here fast by my maidens.

"Let thine eyes be on the field that they do reap, and go thou after them: have I not charged the young men that they shall not touch thee? and when thou art athirst, go unto the vessels and drink of that which the young men have drawn."

We rather suspect that there is *some* sort of *persuasion* going on, but the reader must decide that for himself.

The negatives and prints were made by Messrs. Loescher & Petsch, Berlin, Prussia, and in this number we present a diagram and description of their skylight. We hoped to have received their working formulæ in time to publish herewith, but fear they have been delayed by the preparations for war in that land. We hope to secure them for future publication.

PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

Proceedings at the Regular Stated Meeting, Wednesday Evening, June 6, 1866.

Coleman Sellers, Esq., President, in the chair.

The minutes of the last meeting were read and approved.

The Committee on Dry Plates reported progress, having began experimenting almost immediately after their appointment.

The President remarked that their work was an important one, and no experiments were more valuable to art than such as the committee have in hand.

The President read portions of a note from Mr. Zentmayer, stating that he had received a patent for his new lens. A number of views made with Mr. Zentmayer's lenses were expected, but did not come to hand.

In speaking of this new lens, the President remarked: "It may be a matter of interest to the members to know the history of the invention of the Zentmayer lens, it being one of those contrivances based on a previous knowledge of optical principles, and not the result of accident. About two years ago I was very much interested in the experiments with the Globe lens. I often talked with Mr. Zentmayer on the subject. He, disclaiming any knowledge of the art of photography, and not being familiar with its requirements, spoke with due deference to the opinions of others, but expressed his conviction that the Globe lens was not a theoretically perfect lens; that he could see no reason for the correction of the two independent lenses; that if they were properly made of the same kind of glass, they should correct each other, but that such a lens made in a globe form would be only correct when used to copy the size of the original; that a true instrument would require the front and back lenses to be of different sizes. He then sketched for me the identical lens since patented by him, and explained its theory. I urged him to make one. He being too busy with his microscopes, delayed doing so for a long time; but not to be unprepared, he studied the art of photography, and became quite familiar with it. Then he made one of his lenses, not deviating an iota from

his original theory. One day he surprised me by showing me the finished lens which, upon trial, proved to be all he had represented it to be, thus proving the correctness of his judgment. I have always felt the greatest interest in this invention, as I have in all inventions which promise to advance the art, but more so in this case, as I had known of it from the first conception of the idea, and believe that its ultimation was in a great measure due to my peristent urging him to its completion. I shall be very glad, if it is the wish of the Society, to place the invention in the hands of a committee to experiment and report on its merits."

On motion, Messrs. Wilcocks, Tilghman, Wenderoth, Borda, Davids, and Hurn, were appointed as a committee for that purpose.

Mr. Wilson asked if any one present had ever used the Fitz lens. Mr. Hurn announced that he had done so; that it was essentially the same as the Globe lens. Free from ghosts, slow, and, like the Globe, made of corrected lenses, and in every respect quite as good as the Globe.

Mr. Hurn said he had found difficulty in making solar prints equally sharp all over, and had curved the printing-board, which plan secured the desired result.

On motion, the Society adjourned until the first Wednesday evening in October.

PHOTOGRAPHIC SUMMARY.

BY M. CAREY LEA.

ENGLAND.

Oily Streaks before Developing.—A very common trouble lies in the bath solution not remaining evenly distributed over the exposed plate, but collecting in streaks or drops, of oily appearance, and tending to unequal and defective development. In an article on this subject, the British Journal attributes this tendency to the collodion, as giving a film too horny and too repellent of aqueous solutions. This may either arise from too much ether in the collodion, in which case alcohol may be added, but more frequently the pyroxyline is in fault. With different operators the time during which plates may be kept out of the bath before use, varies extremely; it is a common complaint by operators that they cannot keep their plates more than a few minutes, whilst others can keep them from a quarter of an hour to an hour and more. As the trouble arises from a repulsion between the film and the bath solution, it is evident that we must try to bring them nearer to each other in properties. A drop of water in one or two ounces of collodion would seem a useful addition when the collodion is too horny.

Removal of Hyposulphite.—Some interest has been created by a suggestion of Dr. Angus Smith, to get rid of the last traces of hyposulphite by a bath of weak solution of peroxide of hydrogen. This substance, of commercial strength, is to be diluted with one thousand times its bulk of water, and the prints, after washing in the usual manner, are to lie for a few minutes in the dilute solution. The object is, of course, to convert the injurious hyposulphite into innocuous sulphate. *Br. Jour.*

Dry Work.—A correspondent of the British Journal remarks upon the great certainty and ease which attends dry work with tannin, to which a little honey has been added, in accordance with a suggestion made long since by Mr. England, and cites an observation of Mr. H. P. Robinson, that whilst the exposure is a trifle more, the results are "as good or better than those obtained with wet plates."* His advice is as follows:

The collodion must contain much bromide, and works best when the bromide is three times the iodide in weight. A strong solution of bromide in alcohol may be kept for adding to the collodion, or collodion can be sensitized with bromide of cadmium only, and kept for adding to ordinary collodions.

Excellent negatives may be got from ordinary baths, but the effect is improved by making the bath ten or fifteen grains stronger. Leave in twice the time suitable for wet plates, then lay in a dish of water, and repeat once or twice. Then wash thor-

* Mr. Robinson states that this opinion was held by him at one time, but has long since been abandoned; that in fact he considers the introduction of tannin to have been an evil to photography by reason of its great uncertainty.

oughly with a jug, or from a tap. If the water used be very impure, finish with distilled, but this is not usually necessary.

The preservative solution is fifteen grs. tannin, an equal quantity of honey to the oz., filtered. Pour a little over, work in well, reject, repeat with a larger quantity, which pour back into the stock bottle. Rear up on plenty of blotting-paper, and dry.

Either acid or alkaline pyrogallic developer may be used. Moisten the plate with distilled water, and pour on a two-gr. solution of pyro; if the exposure has been very short, add a few drops of carbonate of ammonia, and leave until all the details are visible. Bring up with acid pyro and silver.

Pictures of great vigor are obtained by developing with acid pyro and silver, only that the greatest care must be taken not to add too much silver, or the contrasts will be too great.

This last mistake seems to have been the cause of very many failures in the tannin work, owing to the fact that the operator does not sufficiently bear in mind that the deposit on the tannin plate is much more non-actinic in its character than the deposit in the ordinary operation.

New Style of Cards.—In order to give a greater variety to card portraits, the English photographers have commenced making them of larger size, using sufficiently stiff mounts to permit of their being transmitted by mail, like the smaller sizes hitherto exclusively adopted. Albums are being made to suit. The sizes are as follows:

Picture, $5\frac{1}{2} \times 4$ inches.
Mounting card, $6\frac{1}{2} \times 4\frac{1}{4}$ inches.
Sight opening in albums, $5\frac{1}{4} \times 3\frac{7}{8}$ inches.

If larger cards than the ordinary card come into use, it is evidently very desirable that a definite size should be universally adopted.

Phot. News.

Getting rid of Excess of Iodide from the Negative Bath.—Mr. Noton remarks that the getting rid of the excess of iodide by diluting is best effected, not by diluting the whole of the bath, but as follows: fix upon the amount of water that you are willing to add, and into this pour drop by drop (or very slowly) a portion of your bath only, and filter. Often a greater quantity of iodide of silver will be separated in this way than if the whole of the bath were so treated. In other words, often more iodide of silver will be thrown down by a large dilution of part of the bath, than by a less dilution of the whole. Half of a quart bath diluted with a quantity of water may let down more iodide, than if the quart of water were added to the whole bath. And the precipitation is, *in every case*, better effected by pouring the bath (slowly) into the water than by reversing the operation. *Br. Jour.*

To Photograph in a Gale.—Tie a string to the screw by which the camera is fastened to the tripod, place the foot upon the string, and draw it tight; this will make the difference between a good and a bad negative. The camera may be inverted and screwed underneath the top of the tripod (made, of course, larger for this purpose), or a bag may be suspended between the legs of the tripod, and filled with stones, but the first method, due to Mr. Burns, of Edinburgh, is the best. *Ibid.*

GERMANY.

Photography on Silk.—The formula of Edelbauer, given in our last, has been corrected in the subsequent number of *The Correspondenz* to that from which it was extracted, so as to read one ounce of water to the whites of five eggs.

Enlargements.—The following for rapid work is recommended: Water, 1 oz.; chloride of sodium, 18 grs.; fluoride of ammonium, 1 gr.; iodide of potassium, 1 gr.; cyanide of potassium, 1 gr.; ammonia, 2; gelatine, 10. Silver bath—nitrate, 30 grs.; lemon juice, 10 grs. to the ounce. Developer, saturated solution of gallic acid. To be fixed with weak hypo, and toned with weak chloride of gold and chloride of uranium neutralized with carb. soda.

Phot. Archiv.

Transferred Positives have acquired a certain popularity. They are printed upon collodionized glass in the camera, and transferred to enamelled paper; have all the fineness of a daguerreotype. *Ibid.*

FRANCE.

Gelatine Developer.—M. Davanne has made a careful study of the various modifications

that have been proposed of the gelatine development which I published last year. He concludes that the action is favorable, especially where there is a tendency to fogging, and that of the different formulæ, the original one published by me is that which gives the greatest intensity.

He has also examined the nature of the deposit on the plate, and concludes that it is metallic silver, and not any organic compound of silver. Organic matter, to the extent of about two per cent., is found with the silver, but mixed with it, not combined. In the case of pyrogallic redevelopment, the amount of organic matter sometimes extends to ten per cent., and Davanne explains the loss of intensity sometimes occasioned in ordinary negatives by varnishing, by a solution of this organic matter, taking place in the liquids used in making the varnish. The nature of this organic matter is not known; Davanne proposes to investigate it.

Bull. Soc. Chim. de Phot.

Economical Printing.—Davanne & Delessert, after examining Schnauss's mode of printing upon crude albumen with weak nitrate baths, state that although the results are remarkable when the weakness of the bath is considered, still, first rate work requires strong silver solutions, and cannot be obtained without them.

Bull. de la Soc. Photog.

Salad for the Photographer.

Worthy Example.—A subscriber, in writing to us, says: "Please find sum inclosed for past infringements and future use of your valuable journal. I have this amount left after paying Dr. Bromide, who has been in town this week."

We trust that others who still owe us for "past infringements" will remit, and that they will not forget, that to enjoy further and "future use" of this journal they must be more prompt.

A correspondent, wearied out with trying to take natural colors, crying babies, standing figures, and speaking likenesses, is working out a new process for taking *striking attitudes*. Being in Washington, he expects to do a large business before Congress adjourns, if the Southern delegates are admitted and he succeeds.

Photography on Silk.—Pour 20 ounces of boiling water on 100 grains of chloride of ammonium and 60 grains of Iceland Moss. When nearly cold, filter, and immerse the silk in it for fifteen minutes. To *sensitize, immerse* the silk in a 20-grain solution of nitrate of silver for 16 minutes. Let the nitrate bath be rather acid. When dry, prepare for printing by attaching the silk to a piece of cardboard a little smaller than itself by turning the edges over and fastening with small bits of gummed paper; slightly overprint. Wash in two or three changes of water and tone in a gold bath, thus: 20 ounces of water, 2 drachms acetate of soda, 4 grains chloride of gold, and a few grains of common whiting. Filter, and keep for 24 hours before using. Let the prints be toned slightly bluer than required to be when finished. Rinse them in water and fix in a solution of hypo, 4 ounces to the pint of water. Twenty minutes is ample time for fixing. Wash well.—*News.*

A Useful Cement.—Take two parts of finely sifted unoxidized iron filings. Mix them with one part of perfectly dry and finely powdered loam, and knead the mixture with strong vinegar until a perfectly homogeneous, plastic mass is formed, when the cement will be ready for use. It must be made as wanted, for it quickly hardens, and once set is never fit for use again. This cement resists fire and water.—*Juneman.*

Another New Source of Artificial Light.—Mr. H. Wilde, of Manchester, has recently made a most important and brilliant discovery, which consists not only in the discovery of a new principle in electrical science, but has applied it to the construction of a

machine, which, by means of the carbon points, will give light of much greater brilliancy than has hitherto been produced by man. So powerful is the current of electricity evolved by the present apparatus, that ordinary photographic paper, at two feet distance from the light, blackens in twenty seconds to the same degree that it will darken by exposure for one minute to the direct rays of the noonday sun on a clear day in the month of March. When an electric lamp, furnished with rods of gas-carbon half an inch square, was placed at the top of a lofty building, the light evolved from it was sufficient to cast the shadow from the flames of the street-lamps a quarter of a mile distant upon the neighboring walls. When viewed from that distance, the rays proceeding from the reflector have all the rich effulgence of sunshine. If Mr. Wilde can simplify his apparatus so as to make its price come within reach, we shall find this new light a valuable aid to photography. Nothing is impossible in this age of light.

Marbled Papers.—Dr. Jacobson has found a new use for the albumen paper that is spoiled in the hands of the dealer. He proposes to stain it with aniline colors, and to employ it for labels, covers of boxes, and general decorative purposes. The papers thus obtained will retain the gloss, the bright "satin" surface of the albumenized material, and are almost as brilliant by transmitted as by reflected light. They are also said to be well adapted for shades, transparencies, paper lamps, and other means of decorative illumination.—*News.*

Vignetting.—Cut a piece out of a sheet of strong brown paper, which is then pasted on the outside of the printing frame (the piece cut out to be exactly the shape required), then paste on a piece of fine silk paper. You can thus vignette any shape you desire."—*News.*

A person speaking to us of the good a journal does, remarked that the only fault he had with ours was this: That every month after reading it he was induced to invest $15 or $20 in the new articles advertised therein. No doubt he gets paid back.

To Varnish an India-rubber Bath.—Dissolve one ounce of shellac in one gill of rectified spirit. Varnish the inside of the bath, and hasten the drying by inserting the nozzle of a pair of bellows and blowing down. A bath solution should not be allowed to remain any longer than necessary in the India-rubber bath. After using, pour it into a bottle and keep until you require it for use again.—*Br. Jour.*

Another Novelty.—In Vienna the hair-dressers place heads of false hair upon their wax models and photograph the various modes in which they can dress these heads. They then send the photographs as specimens of the styles in which any lady having real hair at her command, and a talented hair-dresser as well, can have her tresses arranged. —*Corres. Br. Journal.*

Herr Angerer, in Vienna, communicates with the different rooms in his large establishment by means of the telegraph. Business is dull there.—*Cor. Br. Jour.*

A Berlin artist concludes a poem, read before the Photographic Society there, with the following beautiful comparison:

"As the pure daylight's tintless beams
  Each brilliant rainbow hue enshrine,
So minds of varying gifts and dreams
  May here in harmony combine;
And may we find, if haply aught
  Of discord this our league should try,
Our light in separate rays will be
  But as a rainbow in the sky,
Which friendship's quick return will see,
  As in light summer storms—pass by."

The Zentmayer View Lens.—Mr. Jos. Zentmayer, of our city, has received his patent for photographic view lenses. These lenses are going to create such a consternation among the craft as has not been experienced in a long time. We refer our readers to another column for particulars concerning them. They are doublets made of uncorrected meniscus lenses of different spherical curvatures arranged concentrically, or nearly so. The back and front lenses are of different sizes, and the mountings may be so arranged as to make pictures of large and small dimensions. Their surprising cheapness will place it within the power of every photographer to possess a first-class view lens.

Editor's Table.

Dr. Herman Vogel.—It is with infinite pleasure that we announce that we have been privileged to add Dr. Herman Vogel, editor of the Photo. Mittheilungen, at Berlin, Prussia (from which excellent Journal we so often have to quote), to our already staunch staff of contributors.

To our good friend, M. Carey Lea, Esq., and Dr. Vogel, the fraternity throughout the world is much indebted. They are the most careful experimentalists, the most practical writers, and the most useful men we have, and it is a great pleasure to be able to announce that our readers may hereafter hope not only for a continuance of Mr. Lea's excellent papers, but for regular contributions from Dr. Vogel. His paper on the Aniline printing process and his letter will both be found very interesting in the current number.

We have received a very kind and fraternal letter from G. Wharton Simpson, Esq., editor of the Photographic News, containing a magnificent specimen by Mr. Woodbury's photo. relief process, "Little Sunshine," a charmingly lighted carte, by Mr. H. P. Robinson, and a specimen of carte portraiture by Mr. T. R. Williams. They are all choice gems of our art, and the more appreciated on account of the good spirit that prompted the sending of them, for that assures us of the good will and fellow feeling of the talented donor. Oh! that such a spirit might grow in journalism, and particularly in our own branch. Our subscribers would be in no doubt in the present case, could they read Mr. Simpson's letter.

In speaking of the article by Mr. Wenderoth, on the fading of collodio-chloride pictures, which appeared in a late issue of this Journal, Mr. Simpson says, "I am sorry that the post will not convey glass specimens, or I could have inclosed some which have been printed with collodio-chloride a year and a half without change. They have all been hastily and carelessly done in the midst of pressing literary duties, and I assure you I have never seen a sign of fading. I presume the whole cause of those of Mr. Wenderoth's fading is the unnecessary albumen substratum which he adds, and which *I* did *not* recommend, and which I never use." In our next we shall give some further remarks on the subject by Mr. Simpson. He does not think much of the use of peroxide of hydrogen for eliminating hypo.

He remarks that he "recently travelled six hundred miles to see the carbon process in practical working, and was delighted with its simplicity, certainty, and excellence of its results, and I think it *must* come into extensive use shortly."

We must not close without telling our readers that Mr. Simpson is the author of "Newman's Manual of Harmonious Coloring as applied to Photographs," a little book which we thought well enough of to reprint, and which many of our readers have, and all should have.

We never knew who was the author, or we should have noticed it before.

Michigan State Photographic Society.—The following were duly elected as the officers of the "Michigan State Photographic Society," holding its regular meetings on the second Tuesday of each month, having for its object the advancement of the photographic art and science, and the diffusion of knowledge among its members:

President—Jex Bardwell.
Vice-President—J. F. Raymond.
Corresponding Secretary—G. Grelling.
Recording Secretary—Geo R. Angell.
Treasurer—Moses Sutton.

The Society number already about thirty members, and will be pleased to receive any communication that may be of interest to the craft, and promote in any way the aim of our art.

We have, from Mr. Geo. L. Crosby, of Hannibal, Mo., a very excellent picture, a scene in that city during the great freshet in May last, with the "Father of Waters," and Illinois Shore in the distance. Barns, houses, and hay stacks are tumbled around pretty promiscuously. The picture was sent to give us a "momentary pleasure," and we hardly know which, to think the most of, the picture or the good feeling and kindness prevailing the letter that came with it. Many thanks to Mr. Crosby for both. Such little tokens and words of good cheer go far to smooth our editorial pathway which is sometimes steep, rough, and hard to climb.

We have received from Messrs. Burrows & Bundy, Middletown, Conn., a very pretty view of a portion of the manufacturing portion of Middlebury. It was accompanied by a photograph of the interior of their skylight, which is arranged much like the one described first in our present number, and a 4-4 portrait of a lady, showing a beautiful play of light upon one portion of the face,

but also a broad shadow upon the rest, which entirely destroys the charm of the other. We have also several very excellent *cartes* from Messrs. Burrows & Bundy.

Stereo. Views.—From Mr. J. Cady, Brandon, Vt., we have a very pretty view of the birthplace of Stephen A. Douglas, and another of a view of a street in Brandon, Vt. The latter is of a long avenue with trees each side, and shows excellent distance, but the whole is covered with a disagreeable frosty appearance. This may be avoided by adding a little plain collodion to the iodized solution, and by using a less strong developer. The Fitz lens was used, and these views speak very well for it.

The Zentmayer Lens.—We do not think we are hasty in predicting that the lenses patented recently by Mr. Zentmayer are likely to create a revolution in the market for view and copying lenses.

We await with much anxiety the report of the committee of the Photographic Society upon them, and hope to describe them more fully in our next. The facility with which they may be changed, so as to make large or small work, and the extremely low price at which they may be obtained, will make them immensely popular, and any photographer may possess a view lens that will make wonderfully beautiful work. Full particulars in our next.

Office of the American Photolithographic Company, 95 Liberty Street,
New York, June 5, 1866.

Dear Sir: Your friendly notice of the organization of the American Photolithographic Company, in *The Philadelphia Photographer*, for June, is not correct in every particular. This company has been formed under the New York State laws, affecting corporations for technological purposes, and is, as you state, in possession of the U. S. patents protecting my photolithographic process, to work which it was established.

Our President is Mr. Ezra Cornell, of Ithaca, who is also a large stockholder in the company.

Some little time must elapse before we shall be fully prepared for work; when that point is reached, perhaps, I may ask leave to trouble you again with some observations on this subject.

The insertion of this short statement will much oblige, for it will interest many friends in this and other countries, amongst whom your Journal circulates.

Thanking you for your expressions of good will,

J. W. Osborne,
General Superintendent.

Honor to Whom Honor is Due.—We should have noted some time ago that the faculty of Geneva Medical College (of which our esteemed friend, Dr. John Towler, is a member) of New York, had conferred the honorary degree of M.D. upon our valued correspondent, M. Carey Lea. We know of no one more worthy of this distinguished mark of appreciation than Dr. Lea, and of no one who seeks less for public honor.

Gail Hamilton has in the press of her publishers, Messrs. Ticknor & Fields, Boston, a new volume specially adapted to summer reading, and bearing the taking title of "Summer Rest." Most of the articles in this volume are now for the first time printed, and will be found equal to any of the author's most brilliant essays. Halicarnassus appears again on the carpet; and his exploits in the way of gardening and other domestic matters are made very amusing. Gail Hamilton is never dull. Possessed of a sharp and ready wit, speaking boldly, and that too upon topics wherein women have been supposed to have but little interest, she has already gathered about her an audience, which, by its hearty appreciation of her writings, attests the truth of many of her convictions. The success of her various volumes of essays has been without a parallel; in fact, she is the most successful writer of the day.

The Silver Sunbeam.—As announced in our last, the fifth edition of this valued handbook is ready for sale. It not only contains all of the good old matter, but an *appendix* of some sixty-eight pages, all of which is to be had for the price of the old book. Many new rays of light for dark-doers and many new shades of color for the lovers of the beautiful are therein contained. The Silver Sunbeam should be in every dark-closet as certain as the dictionary in the student's library.

Another Valuable Testimonial. — From Messrs. E. & H. T. Anthony & Co., New York, we have the following valued letter:

"We are pleased to hear of the success of *The Photographer*, and hope that it will continue to prosper more and more.

"We consider it one of the best photographic journals that are published, either in this country or in Europe, and we find it always up with the times."

Announcement.—Mr. Thomas Piper, publisher of the Photographic News, announces "The Collodio-albumen Process, Hints on Composition, and other papers," by James Mudd, to be ready in a few days.

THE

Philadelphia Photographer.

Vol. III. AUGUST, 1866. No. 32.

AN EXAMINATION

Into the Circumstances under which Silver is found in the whites of Albumen Prints.

BY M. CAREY LEA.

The last two years have witnessed the most serious assaults that have ever been made upon silver printing, and for a time, with every prospect of immediate success. Nevertheless, the old process is just as fixed as ever, and there seems as yet little prospect that any of the novelties so vaunted will secure even a humble share of the work. Not that I have the least disposition to undervalue carbon printing. I earnestly hope to see the day come when it will entirely replace chloride printing. Mr. Swan and Mr. Pouncy have produced some specimens of work of beauty so extraordinary as, in my opinion, to have surpassed the best silver printing. And some specimens of Mr. Woodbury's relievo printing are extremely good. But something easier, simpler, and more certain will have to be thought out before the old method becomes antiquated. So long as it does not, it will be a matter of unceasing regret that any doubt should exist as to the perfect permanency. To purchase an exquisitely beautiful photograph, and after a time, to see that fatal yellowness stealing over the high lights, and to know that its final destruction is only a question of time, is a real vexation. Fifteen years ago I purchased, when abroad, a number of Roman photographs, not one of which is now worth the paper on which it is printed, and every one has had similar experience.

It, therefore, is clear that the two directions in which study can be most profitably directed for the advancement of photography, are, in the simplification of carbon printing, and in the determination of all the causes of deterioration to silver prints.

It is a well-known fact, though only lately ascertained, that silver exists in the whites of albumen pictures. I have carefully studied the conditions of its presence, and, without being able to make a satisfactory report of results as I could wish, I hope to have done something towards extending our knowledge in this direction.

Before proceeding to detail the results of individual experiments, I may mention one general fact. It has been asserted that the existence of silver in the whites was due to the action of faint light, passing through the darkest parts of the negative—light too faint to visibly darken the chloride of silver, and thus impair the whiteness of the high lights. I have disproved this in the following manner: A piece of albumenized paper was sensitized at night, dried, washed and fixed, without any exposure under a negative. It was, of course, snow-white. Tested with sulphydrate of ammonia, it gave indications of silver, just as well-marked as other pieces

exposed under a negative, and fixed and toned in the usual way.

There can exist, therefore, no doubt that the presence of silver in the whites is owing to a combination formed at the time of sensitizing, and that it has nothing to do with the exposure.

I have also remarked another fact which has its importance, and which, if not duly borne in mind, may lead to erroneous conclusions. It is that even dilute sulphydrate of ammonia *will make a very evident mark upon albumenized paper which has never been sensitized*, and which consequently does not contain a trace of silver. While wet, this mark is yellowish, and so exactly simulates the appearance produced when a faint trace of silver is present, that even a careful observer might be deceived. Even after drying, the mark does not disappear. The yellowish color, of course, is gone, but there remains a dead mark that contrasts with the brilliance of the general albumen surface, and this all the more strongly as the dead mark is surrounded by a bright border, brighter even than the rest of the albumen surface.

When testing, therefore, in this manner, it is *necessary to let the mark made by sulphydrate of ammonia become completely dry*, before judging of it. And, also, to bear in mind, in the case of very faint marks, that their intensity is increased in appearance by the great alteration of surface caused by the reagent.

I shall next proceed to give the comparative results in the examination of the condition of the whites in a great many different tonings. To make the results fairly comparative, the following method was resorted to. A large negative, highly intensified, so that the high lights were perfectly protected, was printed. A number of different toning baths were prepared, and got into working order, together. The print was washed, then cut up, and different pieces were toned in the respective different baths, were fixed with hyposulphite of soda, and, after drying, were tested with hydrosulphate of ammonia. The specimens thus obtained, some as far back as last winter, and others at various times, were carefully indorsed and noted, and are now before me as I write. In all cases when the contrary is not stated, the prints were made on ammonio-nitrate paper.

(1) Toned in the citrate of gold bath. Fixed in hypo. A camel's-hair pencil or clean pen dipped in dilute sulphydrate of ammonia, and drawn over the whites of this specimen, left a clear buff mark of sulphide of silver.

(2) Toned with benzoate of gold, as described by me. Result the same as the last.

(3) Sulphur toning (trithionate toning), obtained by adding chloride of lead to hyposulphite of soda. This toning, with or without the addition of gold, is sometimes used still for obtaining intense blacks upon plain paper. It is, of course, not to be recommended, and is included here for greater completeness. Here a larger amount of silver seems to be left in the albumen, for the application of the sulphydrate caused a much deeper mark than in the preceding.

(4) The next trial was made with the well-known old toning and fixing bath of hyposulphite of soda, to which gold has been added. On treating the white with sulphydrate of ammonia, indications of silver were obtained, but much less than in any of the preceding. The streak, in fact, was pale yellow.

(5) The lime toning. The indications of silver in this case were but moderate.

(6) Alkaline chloride toning—gave results not varying materially from the last.

The trials in three of the above tonings were repeated subsequently. The citrate and benzoate of gold gave the same results as above stated. The third was the fixing and toning bath of hypo and gold. In the trial above given, it is mentioned that the mark, in its case, was much paler than in the others. In the repetition, a print was obtained of which the *whites were perfectly free from silver*. After the mark of sulphydrate was dry, it could not be found.

The foregoing experiments were made with ammonio-nitrate paper. I shall next record the results obtained with *fumed paper*. This was sensitized on a 40-gr. bath of nitrate of silver, and fumed five minutes.

FUMED PAPER.

Fixed with Hyposulphite of Soda.

In the following trials, the paper was sen-

sitized upon a 40-grain acidulated bath, and was then fumed five minutes with ammonia.

(7) Lime toning. Hydrosulphate of ammonia applied to the whites gave an indication slightly less than the average.

(8) Benzoate of gold toning. About the same as the last.

(9) Citrate of gold toning. About the same, or a little more indication of silver.

(10) A portion of the same print was toned in a bath prepared as follows. Two ounces of hyposulphite of soda were dissolved in 8 ounces of hot water, and chloride of gold corresponding to 1 grain metallic gold was added while hot. The bath was used two or three hours after mixing. This bath toned to a rich purple black. Marks made on the whites with hydrosulphate of ammonia could not be found after drying, thus indicating a complete absence of silver.

Sulphocyanide Fixing.

A print was made on paper sensitized on a 40-gr. acidulated bath, fumed ten minutes with ammonia, and printed under a strong negative. It was then cut up.

(11) A portion was toned with alkaline chloride, and fixed with hyposulphite for a comparison. It gave, with sulphydrate of ammonia, results similar to those already noted.

(12) Toned in the same way, and fixed with sulphocyanide of potassium.* Result, with sulphydrate of ammonia, about the same as the foregoing.

(13) Toned and fixed in a bath of sulphocyanide of potassium and chloride of gold. Result as before. A camel's-hair pencil dipped in dilute sulphydrate of ammonia, and drawn across the whites, leaves a well-marked pale buff streak.

(14) Toned and fixed in a bath of sulphocyanide of potassium and fulminating gold. Result the same. (In fixing with sulphocyanide, it appears more difficult to keep the whites clean than with hyposulphite.)

Fixing and Toning Bath.

(15 and 16) Two further trials were made with the fixing and toning bath of hyposulphite and gold. In these the same bath as before was used, now four and five days old respectively. The results were the same. Whilst in every other case the marks produced by the sulphydrate were clear and well marked, in these last, as well as in (4) and (10), the marks were either invisible, or could only be found by close and attentive inspection. This result was to me altogether unexpected. The fixing and toning bath has been so loudly accused of all sorts of mischief, especially of being "wrong in principle" (which it certainly is not), that I was extremely surprised to find it possess this very striking superiority in so important a point.

I did not, however, rest contented even with these repeated trials. Having printed a number of prints from various negatives, I toned some of them in the ordinary methods, and fixed and toned some with the hyposulphite and gold. I then applied the sulphydrate to the high lights, and found that in all cases the same superiority existed. In fact, all the prints which had been so toned and fixed, could be picked out by mere inspection of the sulphydrate mark.*

I am, therefore, prepared to state as a fact that does not admit of a doubt, that a print fixed and toned with hypo and gold, contains less silver in the whites than when treated in any other of the methods which I have described. My remarks must be understood as applying to a bath properly managed. If the same bath is used until by the action of the chloride of silver upon the hyposulphite, a quantity of tetrathionate of soda is formed, the results as respects the silver in the whites may be different. That is a point which I have not cared to examine; it would have no real value, whatever the result might be, as the use of such a decomposed bath is to be condemned on other grounds.

I am aware that the ground which I have taken here, namely, that a fixing and toning bath gives the purest whites, chemically speaking, will be apt to arouse much opposition. To such as may call my results in question, I say, prepare the bath as directed

* The ammonium salt at the time when these trials were made was not to be had here. I, therefore, employed sulphocyanide of potassium of my own preparation, and perfectly pure.

* Quite recently I have repeated these experiments with a similar result.

at (10), and observe the results. These are matters that must be judged by experience, not by theory. Nor is it to be supposed that I have been influenced in my conclusions by a prejudice in favor of this method. On the contrary, my prejudices were the other way; I had read such bitter attacks upon this mode of proceeding that, except while making these experiments, I have never used it, but have toned and fixed separately.

I now come to another part of the same subject; a part in which I regret that I have not been able to arrive at any positive conclusions as satisfactory as I could wish. I think, however, my results will be worth stating briefly, both because I may save others the trouble of making similar investigations, and because, by illustrating the extraordinary tenacity with which the silver remains combined with the albumen, they give greater completeness to an examination which has required no small expenditure of time and attention.

The existence of silver in the highest lights, the purest whites of the finished picture, cannot be looked upon otherwise than as a very great evil. So long as it is, there are far fewer chances for the permanence of the print, and if any way could be found for removing it, without injury to the rest of the picture, it would be a great advantage. This is a very difficult problem, and one which I have been as yet unable to solve. It was at one time asserted that fixing by sulphocyanide of ammonium removed this portion of the silver, but this again was contradicted, and as we have seen, very properly. Indeed, if there exists any preference in this respect, it is in favor of the hyposulphite. But the difference is too inconsiderable to be worthy of attention.

There is another important point to be borne in mind, which follows directly from the examinations here recorded, and which has not before been adverted to. As the silver in the whites is not there by any action of light, but simply in combination with the albumen, *this peculiar combination of silver and albumen is necessarily present in every part of the picture.* It is not more present in the high lights, than in the deep shadows, though its presence can only be made evident to the eyes in the former. The silver is present in an entirely different form, from the reduced silver which constitutes the body of the picture until it is toned; it is liable to be differently affected by all external circumstances, and undoubtedly forms an element of weakness in the finished print.

The fact that silver is present, not by any influence of light, but simply in combination with the albumen, seemed to establish a possibility that some means might be found of dissolving it out. It seemed possible that some reagent could be found, which would either dissolve out this silver, or bring it into a condition of solubility in hyposulphite. Could such a reagent be found, it might either, according to its nature, be placed in the gold toning bath, if capable of such application without injury to the bath, or the prints might be passed through the solution immediately after their first washing. The following substances were examined:

Ferrocyanide of potasssum.
Ferridcyanide of potassium.
Iodide of potassium.
Bromide of potassium.
Chloride of ammonium.
Acetate of soda.
Phosphate of soda.

The papers, after being cleared of free nitrate of silver by washing, were placed in solutions of these respective substances for about ten minutes. They were then placed in a very strong solution of hyposulphite for a quarter of an hour, and then thoroughly washed. On testing them with sulphydrate of ammonia, together with a portion of the same prints treated in the ordinary way, on comparison no difference could be found, except that the paper treated with iodide of potassium gave a darker shade than any of the rest. In fact, iodide of silver dissolves in hyposulphite of soda much more slowly than chloride or bromide. A piece of paper prepared with iodide of silver retained its yellow color almost unimpaired after fifteen minutes' exposure to a strong hyposulphite bath; some even remained at the end of half an hour. After eighty-five minutes the sil-

ver was perfectly gone, but sulphydrate of ammonia still produced the buff streak.

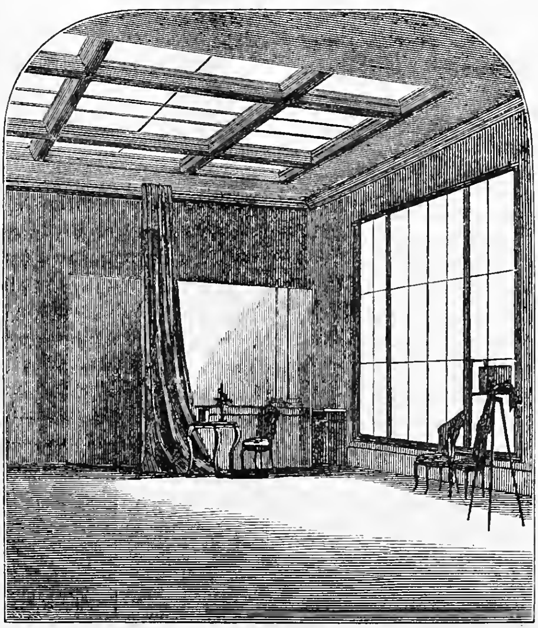
It follows, therefore, that no substance (as far as these experiments go), is capable of dissolving out the silver from the albumen.

FURTHER REMARKS ON LIGHTS AND LIGHTING.

We trust our readers will not grow tired of this subject. It is a very important one to them, and we have endeavored to collect for them all the information thereupon that we could from our co-workers, and from our own feeble experience. In our number for June, we presented a fine photograph by Mr. William Notman, of Canada, and a drawing of the sky-light in which it was made.

In this, we present a specimen of a different class of work, made by the same gentleman, but in another studio, a drawing of which will be seen below.

A description of the picture and Mr. Notman's formulæ will be found elsewhere. The cut represents the interior of the room in which the artist makes most of his sittings for ordinary portraits. It is 50 feet long, 20½ feet wide, and 14 feet high from the floor to the flat light above. The side-light is 10 feet 6 inches high, by 15 feet wide. The flat top-light is 15 feet square. Over this flat light there is a sloping top or roof-light, 15 feet wide, and about 13 feet deep. As the slope is rather steep, and there is snow upon it much of the time, the flat light is introduced to prevent leakage upon the sitter during the melting season.



The side-light stands due north, and the sitter usually faces the east, though both ends of the room may be used. This method of lighting is somewhat different from what we are used to, but in Canada they do not have as much bright sunshine as we do, and they are, therefore, able to sit the model differently. It is almost the universal rule in our city to face the model northward.

The picture tells its own story. Mr. Notman is very happy, indeed, in posing. There is an easy grace and naturalness about his pictures that we would much rather see than the most exquisite sharpness and detail, though he by no means allows these to suffer.

Having now published plans of many of the best ateliers in the world, we will close these papers for the present with a paper on *Light for the Studio*, followed by some remarks thereupon by its editor, which we extract from our valued contemporary, the Photographic News.

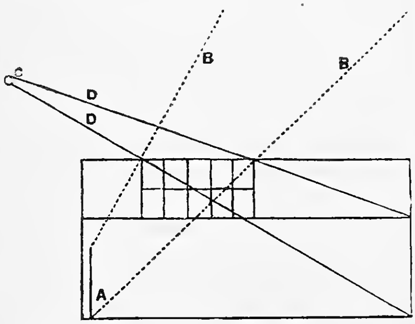
"We will, if you please, pay a visit to a panoramic exhibition; not that we care to see the pictures, but I think we may study the system of 'lighting' to some advantage. Having taken our seats, we observe three things. First, that the picture before us is brilliantly illuminated; secondly, that the source of light is carefully concealed; and, thirdly, that the audience are in almost utter darkness.

"We will now light, say, a dozen jets of gas in different parts of the room, and what is the result? The light, falling between the audience and the picture, has considera-

bly marred the beauty of the latter; it looks comparatively tame and foggy. Turn out the offending lights, and its brilliancy is instantly restored.

"Now, sir, I cannot help thinking that unless we apply this principle of lighting to photographic studios, we do not give our lenses fair play. The conditions are the same: illuminate the sitter; remove all diffused light between him and the lens; and keep the camera in darkness. The question is, how can it be done? That question, with the aid of a few diagrams, I will endeavor to answer.

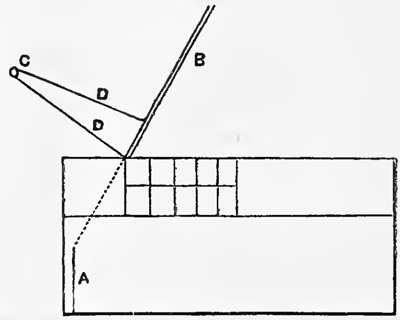
Fig. 1.



"Fig. 1 is a longitudinal section of an ordinary ridge-roof studio, 30 feet long, 9 feet high to the eaves, and 5 feet from level of eaves to ridge, making in all 14 feet. Six feet from the background, over the head of the model, is opaque. The sky-light is 10 feet long, and the remainder of the roof is opaque. A is the model, 6 feet high, and the dotted lines, B B, drawn from his head and feet, and cutting the roof at the extreme ends of the sky-light, show the quantity of 'direct' light he is capable of receiving from that source; C is the sun, who very unceremoniously floods the camera end of the studio with his rays (D D), tormenting the unfortunate operator almost beyond endurance. A quantity of light also descends vertically into the room. This and the sun constitute the dozen jets we saw lit between the audience and the picture, and which, in the next diagram, we will endeavor to 'put out.'

"Fig. 2 is similar to Fig. 1, with this exception, the dotted line B, from the head of the model, through the sky-light, which was only imaginary in Fig. 1, has become an opaque sunshade, or shield, which effectually prevents the sun from entering the studio. As it is carried up to a point exactly above the extreme end of the sky-light, it also cuts

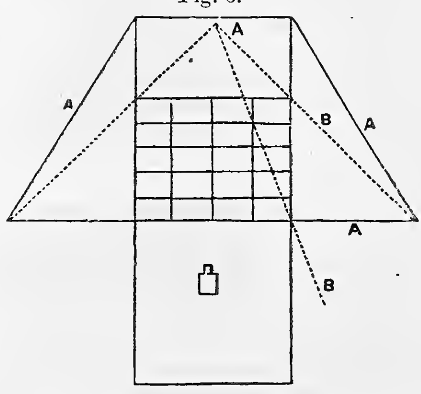
Fig. 2.



off the whole of the vertical rays which fell upon the floor, and being reflected in various directions, did their best to destroy the brilliancy of the picture; in fact, a number of the obnoxious 'jets' are extinguished without in any way interfering with the direct north light which still falls upon the model at the same angle as at first.

"If this method of lighting is good for the sky-light, it is also good for the side lights (I mean windows in the sides of the studios). Shade these in the same manner, being careful not to interfere with the direct north light, and the lens, no longer having to fight its way through a fog to get at the model, will gratefully express its sense of relief by the increased brilliancy of the image projected upon the plate.

Fig. 3.



"Fig. 3 shows the shape of the roof shield (A A A A), and also the angles of the side

shields and their distance from the house. These may commence at the south end of the studio, or at the junction of the dotted lines with the sky-light. B B show the angle of direct side light falling upon the sitter to be exactly the same as if the shields were not there.

"To carry this plan out in its integrity, a plot of ground 37 feet by 30 feet would be required. Where this is not available, the top shield alone may be used.

"It is generally admitted that a high wall behind the sitter is advantageous, and why? Because it keeps the sun away. Upon this principle the accompanying design is based. The top shield may be looked upon as a wall bent over the studio. No upright wall could be built high enough to have the same effect; viz., to intercept the whole of the vertical rays. The side shields may be considered as walls bent at an angle to intercept the direct rays from east and west, which, coming in from those points, illuminate, not the model—they cannot reach him, but by reflection—but the floor and sides of the studio, and may be looked upon as a blaze of light between the camera and the model, which the lens must pierce before it can reach the latter. I think the direct light which falls upon the sitter from the north will produce the most perfect pictures possible; but those who prefer a light from east and west as well can glaze the whole of the shields, making them part of the studio, and shut out the sun with opaque blinds.

"I think it is a great mistake to permanently close the background end of the studio, because an opaque blind will always do that, and many good effects upon the background can be secured, especially if it be only held by a cord at the top, passing through a block; this will allow it to be inclined at any angle. R. A."

"In our last, a communication from 'R. A.' very pertinently illustrated the detrimental effect on the brilliancy of the picture produced by unnecessary light in the studio. This is a subject upon which we have often written; and the idea illustrated cannot be too often enforced. The reflections from a variety of objects, and the light from a mass of illuminated atmosphere reaching the lens, instead of the light only from the objects forming the picture, must necessarily tend materially to destroy brilliancy.

"Any one gazing into a stream of water will find that he has to look for some time very carefully before he can distinguish objects in the water; but let him place his eye at the end of a tube, the other end of which is just in contact with the water, shutting out all surrounding light, and he will be able to see objects in the water almost as perfectly as in the atmosphere. Again, it said that a person at the bottom of a deep well can, on looking upwards, see stars in the daytime. What is true of the human eye is true in the lens: reflections from many objects, or from an illuminated atmosphere, mingling with the rays from the object to be defined, destroy the brilliancy of its image.

"There are many ways in which the lens can be protected from false lights. Our correspondent last week indicated some. A year or two ago we suggested a system of screens having the same object. Many persons, including Mr. Claudet and other distinguished photographers, inclose the camera in a travelling dark-room. Others use a cone in front of the lens, projecting about a foot. Mr. Robinson, in his admirable article on the 'Glass-room,' provides for the light chiefly reaching the sitter, but he also employs such a cone as we have described. Some photographers darken permanently one end of the dark-room, and some even resort to the use of an unsightly tunnel.

"We recently paid a visit to the studio of M. Silvy, now in course of rebuilding, and of which, when complete, we shall probably give a description. In the meantime we may observe, that it possesses ample facility for removing all unnecessary light, without in any way interfering with comfort and elegance. Each end of a capacious studio, of about forty feet long by twenty feet wide, is well protected from unnecessary light. The lighted central compartment has two lofty side lights thirteen feet high, joining a roof-light on each side of two or three feet more. The side-light extends about ten feet on each side, whilst on the west side it extends about ten feet additional in advance of the sitter; these additional windows not being, how-

ever, quite so high as the main side-light. There is also a small portion of high front light, which can be used if occasion require. But the chief feature of the studio is the facilities provided for shutting off effectually all light not absolutely required for illuminating the sitter. This is the point we insist on. In the ordinary oblong room with the ridge roof, the simplest form of studio, this may be secured as well as in any other arrangement, and will permit the end to be obtained without any sacrifice of comfort and elegance."*

FADING OF OPAL PICTURES.

Our readers will remember a paper with the above caption, recently read by Mr. F. A. Wenderoth before the Photographic Society of this city, and published in our pages (page 114). In our last issue we announced the receipt of a letter from Mr. G. Wharton Simpson, to whom we are all indebted for his Collodio-chloride process, and quoted some of his remarks upon this subject. In a late number of the News, of which Mr. Simpson is the editor, he further says, "We have seen some of Mr. Wenderoth's pictures on albumen; nothing could be more beautiful than they were, and we could not help regretting at the time that the insoluble compound between silver and albumen still remaining in the whites, where no silver should be, must inevitably, eventually, be a source of injury to such charming pictures.

"Of course, as this process is a bantling of our own, we are bound—although, having introduced it fairly into the world, and given it to photographers, we have no further responsibility in the matter—to see that it is not the victim of misconception or misrepresentation. We have printed opal pictures more or less frequently, at intervals, for a year and a half, and we have seen the pictures of hundreds of others, but we have not seen, nor had we heard of one faded, until we saw this general statement by Mr. Wenderoth. We have before us some of the earliest we produced, none of which received excessive care, not being washed more than a minute or two in any instance, and they are as fresh and pure as they were when first produced, upwards of twelve months ago.

"How is it, then, that they have been less stable in Mr. Wenderoth's hands? He gives, unconsciously, the explanation in his statement of the case. His plates have received a preliminary coating of albumen, which is, he suspects, 'the seat of the evil.' In this he is doubtless correct, but not simply because the hyposulphite of soda is not readily removed, but because, as we have before said, silver forms an insoluble compound with albumen, which remains after the most perfect fixing and washing. It is true that the amount of fading produced by the albumen and silver need not always be serious, unless the prints have been submitted to a strong light; but it undoubtedly may and often will cause serious degradation of the purity of the whites.

"The singular part of the matter is, that Mr. Wenderoth seems to regard the use of the albumen, not as an innovation, but as a necessity, and part of the process. Now we have never felt any such necessity for a preliminary coating. In our earliest experiments we found that the collodio-chloride of silver, pure and simple, without any organic addition, which worked well on paper, gave a gray weak image on glass. In one or two instances we tried the effect of an albumen preliminary coating, which gave great vigor and richness, but detracted materially from delicacy, as well as increased troubles. The addition of citric acid was then tried by Mr. Swan with great success, and we have not found, in any instance, difficulty in obtaining the fullest amount of vigor without any preliminary coating whatever We add neither Canada balsam nor castor oil to make the film adhere. With a good plain collodion, rendered sensitive by the means we have frequently described, it is sufficient to treat the edges of the film with lac varnish or a solution of wax in benzole, to prevent any risk of losing the film; whilst, as regards blisters, we have seen none whatever.

"On the question of fading, we shall be glad to have the experiences of any of our readers. There is absolutely no reason why

* It will be remembered that we published a diagram of M. Silvy's light in our last number. —*Editor Phila. Photographer.*

such pictures should fade; they should be amongst the most permanent of pictures. There is no insoluble compound of any kind formed between collodion and silver, and nothing whatever present which, if the print is perfectly fixed in fresh hyposulphite, and well washed for a few minutes, should cause the slightest change."

We can add our testimony very truthfully as to the charming and peculiar beauty of Mr. Wenderoth's pictures on porcelain glass. They are indeed very fine, but we have also seen very fine ones made by several other parties in Philadelphia, Boston, and New York. We have also seen some that were very badly faded, and blistered also, after being finely colored, but we think that both of those troubles were caused more by careless manipulation than by the process used. We should be glad to hear of the experience of some of our other photographers. These pictures are so beautiful in every way that we really ought to try to improve ourselves and each other all we can in making them.

CHROMO-LITHOGRAPHY.

As photography and lithography travel so often hand in hand, as we hear of so many photo-lithographic processes, and as it is part of our mission to encourage art, to raise the tastes of the masses to the beautiful, and to tell them what is beautiful, we need ask no apology for offering a paper upon the subject of *Chromo-lithography.*

From Messrs. L. Prang & Co., publishers, Boston, Mass., we have received a series of nine chromo-lithographs, representing marine and landscape studies from nature, and a 10 × 12 chromo. of some little chickens, after an oil painting by A. F. Tait, the renowned chicken painter. The former are very beautiful in their way, but so far eclipsed by the latter that we will have to forget them in our admiration of the chickens.

The picture represents five little chicks, apparently twenty-four hours old, who have strayed away from the maternal feathers to forage on their own account. Two of them are pulling at a beetle, while the others, amazed at such youthful combativeness, have assumed the most beautiful attitudes imaginable for baby chickens, and are looking on, ready to seize the coveted morsel, should the contestants let it drop. One involuntarily exclaims, when looking at them, that they are *real chickens*, and that they can almost be heard to chirp. The picture is certainly the most successful one of the kind that we have yet seen, and we know not why such baby pictures may not be often repeated by photography and chromo-lithography without a touch from Tait's or any other artist's pencil. Would we not then have photographs in colors? who can tell but what the future success of photography in colors lies in this direction? Our readers may see how this can be possible when we tell them how chromo-lithographs are made. We have twice visited the immense establishment of Messrs. Prang & Co., and have there seen the workings of their process.

Chromo-lithography is the art of picture-printing in colors from stone, and, although not a very recent invention, it has been greatly modified and improved of late years; it might, with propriety, be called mechanical painting, as the colors are laid on one after another, mingling the different tints and shades until the picture is complete, in a manner analogous to painting with a brush; and, provided the men who undertake the work are skilful artists, there is no reason why a chromo-lithograph should fall short, in point of expression or delicacy, of the original painting which it is designed to imitate.

As it is familiar to most of our readers, we hardly need say more about the ordinary lithographic process than that a lithograph is a chemical drawing upon stone—the drawing being made with a greasy or oily ink upon the peculiar quality of limestone found in the quarries of Solenhofen, Bavaria. All other processes of engraving are mechanical rather than chemical, as in wood or type work, where the impression is obtained from a raised design, or in copper and steel plates, where the design is made by deep incisions, into which the printing ink is rubbed. In the lithographic process, however, there is neither *relievo* nor *intaglio* design—the operation is dependent simply upon the chemical affinity existing between the greasy matter employed for drawing, and that constituting the printing ink, and

the antagonism which this matter has for water, with which the stone is in all cases dampened before pulling an impression.

In chromo-lithography the process is identical, except that a different stone is required for every color employed, and the ink used is a species of oil color, similar to that adopted by artists for painting. The number of stones used depends upon the number of colors required, usually varying between ten and thirty, and the time necessary to prepare these stones for an elaborate piece of work extends over months, and sometimes years; but the number of colors in any given picture is not always an indication of the number of stones employed, as the colors and tints are multiplied by combination in being printed one over another; thus, in an engraving in which twenty-five stones are used, there may be upward of one hundred different shades of color obtained by this means. The amount of labor and detail involved in drawing the different parts of the design upon so many stones is almost inconceivable to one who is uninitiated. The *modus operandi* is as follows:

Upon the first stone a general tint is laid, covering nearly the whole picture, and as many sheets of paper as there are to be copies of the picture are printed from it. A second stone is then prepared, embracing all the shades of some other color, and the sheets already printed with the first color are worked over this stone. A third, fourth, fifth and sixth follow, each one repeating the process, and adding some new color, advancing the picture a step further, until the requisite number of colors have been applied. The printing of so many colors, and the time required for drying each before the application of a succeeding one, involves months of careful and anxiously watched labor. Great care and skill are required to perfect what is technically termed the "registering," or that part of the process which provides that the paper falls upon every stone in exactly the same position relatively to the outline. To attain this end, stout brass pins are fixed in a frame surrounding each stone. These pins penetrate the paper in making the first impression, and, the holes thus made being carefully placed over the pins in all subsequent impressions, insures the certainty of the outline on every stone always falling into the same position on every sheet. At last, however, it leaves the press to be sized, embossed, varnished, mounted and framed. The embossing is that part of the operation necessary to break the glossy light, and soften the hard outlines, a broken structure being given to the print by being passed through the press in contact with a roughened stone.

Heretofore we have been compelled to look to England or Germany, when wanting a fine chromo, but we are rejoiced to find that it need no longer be so.

This makes the efforts of Messrs. Prang & Co. the more praiseworthy and acceptable, and we trust that ere long every American drawing-room may be decorated with American chromos, after the originals of American artists. Photography is going to be an immense help to this new branch of art in this country. Some day we shall have some of Watkins's magnificent Yosemite views reproduced in natural colors by chromo-lithography.

Photography welcomes this new handmaiden, and will gladly assist her in catering to the wants of good taste and refinement. Success to them both, their helpmates and their votaries.

OPALOTYPES ON IRON.

EDITOR PHILADELPHIA PHOTOGRAPHER.

DEAR SIR: Herewith I send some pictures for your inspection, which will demonstrate that I have solved the problem of Opalotypes on Iron. Mr. V. M. Griswold, my brother, obtained a patent some months since for that style of picture. About the time of his first experiments I was East, on a visit, and expressed my opinion at that time that the white enamel should be made simply a support for the sensitive layer, as in the case of porcelain plate. He worked with the idea that *the white enamel itself* should be sensitized. After I returned home, he sent me some of his preparations, and, at my request, some of the white enamel *unsensitized.* I tried his formulas as sent, and could obtain only unsatisfactory pictures. I then set to work to carry out my own ideas, making the unsensitized white enamel a base of operations. I

have worked faithfully for about a month, and have finally hit upon a process, simple and certain, and which is capable of numerous applications. I send specimens upon glass and iron.

Yours, truly,

M. M. Griswold.

Columbus, Ohio, June 26, 1866.

P. S. The specimen on glass is not a fair test of the process, as I was about out of this enamel, and, in reducing it, got it too transparent, and the toning is cold. When my brother sends me some more of the enamel, I will send something better.

M. M. G.

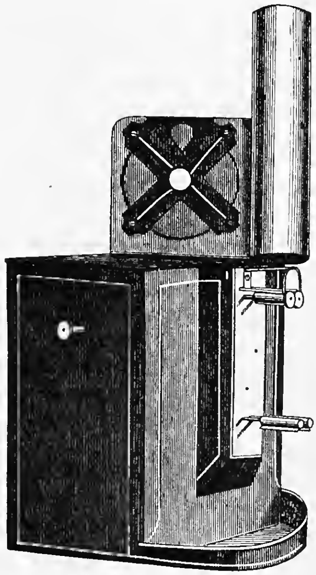
The pictures sent by Mr. Griswold are infinitely superior to those sent us by his brother, and no doubt he has "hit" the right process. The picture on glass is of medium size, and scarcely needs the apology made for it. It is very beautiful, and made on plain ambrotype glass.

The other two specimens are on whole size iron plates, and certainly make us very hopeful for the future of white pictures on iron. The printing is beautifully sharp, and the model tastefully lighted. The drapery being white and the picture printed in vignette style, does not, of course, show to advantage, but is very good. They are, indeed, very beautiful pictures, having a peculiar softness about them quite equal to either ground porcelain glass or porcelain surface paper.

Still Mr. Griswold hopes to improve upon these, and we shall look forth with interest for further information from him. He not only knows how to work out a process, but his pictures are a convincing evidence that he knows how to pose and light his models. We wish Mr. V. M. Griswold would hasten his preparation into market, so others could also experiment with it. Ed.

MAGNESIUM LAMP FOR THE MAGIC LANTERN.

The magnesium light is not only useful in photography, but it is growing into favor for magic lantern purposes. At a recent trial we were much pleased with it, and it compared most favorably with the lime light. Owing to the imperfect working of the lamp used, we were unable to secure a very *steady* light, but that difficulty has now been quite overcome by improvements since made in the lamps provided for that purpose by the American Magnesium Company.



Above is a cut of one of these new lamps. To those who read our description of the lamps used for photographic purposes, we need hardly explain this one. It is much smaller than the other, and made to sit inside the magic lantern. It gives an amount of light quite equal to the other, and for general illuminating purposes seems quite as good. At a recent German festival held in our city in the evening, the great hall was made as light as day for several hours by magnesium burned in three of these lamps, to the delight and wonder of all present.

MOOSE-HUNTING IN CANADA.

Photographs, by W. Notman, of Montreal.

Mr. Notman has kindly sent us another series of seven magnificent photographs, illustrative of Moose-Hunting in Canada, and taken similarly to those described by us a short time ago as illustrating the pleasures and perils of Cariboo-hunting.

Like the others, these are pictures of out-

door life made in the skylight. An inconceivable amount of trouble has been taken, and patience expended to make these pictures the wonderful success they are. To those who have no journals to edit, and who have time to go moose-hunting, they must seem very natural. To us, they are very valuable specimens of photographic skill and manipulation, and will often be examined with pleasure. No one can look at them without wondering.

The series begins with a picture of the "Old Hunter, 83 years old." In a thicket, on bended knee and rifle in hand, the old man is watching for the game. He also figures in the next picture of the "Three Guides." They are all hard at work, mending their snow-shoes, cleaning their pieces, and, of course, smoking their pipes.

A good chase must now intervene, and after a day of hard work and additional appetite, the next scene is "Night; asleep in the Cabane."

The "cabane" is made of trees and brushwood, and in it, outstretched upon the ground, lie the snoring hunters, while the sleepy sentinel with his head in his hands, and his elbows on his knees, keeps guard at the entrance, longing for the hour when he may awaken the relief, and seek himself a soft spot upon the ground.

"Early Morn" has come, and with it a "Surprise." The frightened hunters awaken at some strange noise, too loud for the coarse breathing of the sentinel. The latter individual has disappeared, and in his place stands a huge black bruin, munching the contents of the mess-kettle. From the pointing of one of the rifles near by, we imagine bruin's pastime was soon made to come to grief. The whole is a very pretty "Surprise Picture," and most admirably executed, as was the bear, no doubt.

This "Surprise," probably, gave all hands a good appetite for "The Breakfast," which is the title of the next production. The sentinel has returned, and seems quite as content to share the meal as to have Mr. Bear eat the whole of him. This is a familiar scene to all who have enjoyed the trials and pleasures of a camp life. Our wives and sweethearts would laugh at these men as they cut bread, broil meat, and stir the omelet; but we know how good such meals taste, whether on a moose-hunt or a photographic expedition.

The next picture, we agree with Mr. Notman, is the gem of the lot, as a picture. He could not have imagined more than he has reproduced. It is "The Death" of the moose.

The feeling of perfect exhaustion depicted in the face of the young Indian who, with snow-shoes still on his feet, sits, looking at the cutting of the throat of the fallen moose, is truly sublime. He has doubtless done the hardest of the running, and is too weak to help finish his work.

"The Return" ends the series. The trappings are all packed up, the game put on the sledge, and the party, well satisfied, forsake the "cabane," and are ready to march homeward.

Mr. Notman certainly deserves great credit for his efforts to advance photography in this direction. The pictures look so real that one would hardly imagine they were compositions of brains, patience, and hard work.

PHOTOGRAPHIC SUMMARY.

BY M. CAREY LEA.

ENGLAND.

Photographic Dark Shadows and High Lights Simultaneously.—Mr. Nelson Cherril observes, that having been struck with the fact that the presence of much silver tends to increase the deposit on the high lights, and reasoning from the fact that the difficulty of getting details in the deep shadows at the same time as the high lights depends upon the difference of exposure needed in the two cases, he was led to try the effect of diminishing the quantity of silver in the development. This he did by adding iodine, or an alkaline iodide to the developer, in small quantity. Either succeeded, but Cherril seems to have preferred the former. A part of the nitrate of silver in the bath solution adhering to the plate is thus thrown down in yellow flakes, which do not interfere with the development, and readily wash off. The editor of the *News*, in publishing these hints, remarks, that a specimen print

sent with them exhibited the most delicate details in shade and foliage, at the same time that boulders, &c., lying in the sun, were correctly rendered.

The system of attaining this same end by giving a long exposure, followed by a very weak developer, is probably familiar to most who read this. But Mr. Cherril's plan seems to proceed on truer principles. Extended experience, however, can alone decide these questions.

But should this principle be found to be correct, there would be a far better means of carrying it out practically. This would be to have a bath or a pan of weak silver solution, say of five, or even less per cent., in which to plunge the plate after exposure, and before development. When all the details were out, a redevelopment should be applied to get the necessary force—at least it might generally be found necessary. For such work as this the gelatine developer would be found especially efficacious, because it would enable the operator to proceed at his leisure, with the least fear of fogging; and then a few drops of silver solution added to the developer would give the needed strength, with less danger of filling up the silver in the lights than with pyrogallic acid.

Glass Rooms. — The question between "ridge roofs" and "tunnels" continues to be debated. M. Silvy, a prominent photographer, has pulled down a ridge-roof room, and replaced it by a tunnel, with favorable results.

The fact of the matter seems to be that the choice between the systems seem to depend upon the position and facilities of light. Some photographers—having an "unmanageable light," like M. Silvy—cannot work to advantage when the sun is high. These find the tunnel system works best. Others find that with the tunnel they get an insufficient illumination; such succeed best with the ridge roof.

Chlorides on Dry Plates.—From some first trials, Major Russell contends that the addition of a little soluble chloride to a bromized collodion (containing no iodide), intended for tannin dry plates, is an advantage.

Rendering Glass Non-actinic.—Mr. Nicol adds iodine to varnish till he obtains a deep yellow or orange color, and applies this varnish to the glass.

Globes and chimneys may thus easily be rendered non-actinic by pouring the varnish inside, and turning around till the liquid is everywhere applied. *Br. Jour.*

Iodine seems objectionable on account of its evaporating. It would seem better to use tincture of turmeric, which is free from this objection. The addition of a single drop of solution of caustic potash, or a fragment half the size of a pea to a considerable quantity of material, will *greatly* darken the color, and give it a very desirable non-actinic red shade.

Portraits Out of Doors.—Major Russell remarks, that "the doorway of a common coach-house will afford the means of lighting the sitter well, if not too much obstructed by trees or buildings in front, when the sun does not shine into the doorway."

"If the sitter have white hair and overhanging eyebrows, he should be several feet in; but if his features require more top light, the more this is the case the further forward he must be placed."

Further, that "the camera should never be placed directly in front, but in an inclined position. The more it is wished to throw the principal light upon the face, the more the sitter should be inclined to the side of the doorway, moving the camera accordingly." *Notes.*

Action of Light on Bromide, Iodide, and Chloride.—Mr. Sutton having published a theory that the sensitiveness of these compounds depends upon the presence of a small quantity of water, which, by the action of light in the presence of the silver compound, is decomposed, Major Russell has experimented with very carefully dried materials, and finds the presence of moisture to be nowise essential, so that Mr. Sutton's view cannot, as it appears, be sustained.

Notes.

Fogging.—If a plate be left too long in the nitrate bath, so long that the whole of the alkaline iodides and bromides in the collodion are decomposed, fogging will take place in the development, supposing that the collodion was neutral, and free from iodine, the bath also, but not if the collodion con-

tains iodine, or the bath have been acidulated. *Br. Jour.*

(Even when the immersion has not been excessive this result will often follow.)

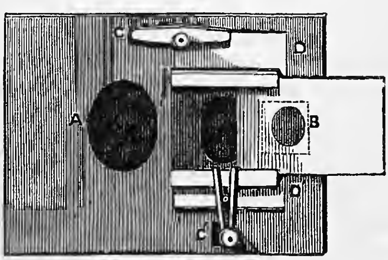
GERMANY.

Development of Positives.—Liquids are sold in Paris, in three bottles, at thirty-five francs the set, for the development of enlarged positives. Dr. Schnauss has, by request, analyzed these, and they prove to be of almost the precise nature of the lead developments which I published in this Journal, and which M. Libois subsequently took up. Those who sell secret preparations at exorbitant prices ought at least to invent, not borrow, their secrets.

Retouching.—Geldmacher has examined the permanency of aniline colors for retouching, and pronounces it inferior to that of ordinary water colors. In this opinion other German photographers appear to agree; also, that ordinary water colors, though better than aniline, leave much to desire in respect of permanency, which, however, may be increased by a coating of wax. *Mittheil.*

VIGNETTING APPARATUS.

ALMOST every photographer has a way of vignetting peculiar to himself or to his own ideas, and almost all of them answer their purpose. The following figure represents a



vignetting apparatus, a photograph and description of which has been kindly sent to us by Mr. T. E. Hanbury, photographer, Memphis, Tennessee. Its chief merit is in being so simple that almost any one can make it, and apply it to the ordinary printing frame.

A is a sheet of tin of the proper size to fit in the printing-frame, and furnished with openings of the shape, size, and number desired. The slide, B, is made of ordinary card-board, also supplied with the openings necessary, and made to slide in and out over the sheet, A, through the brass or tin guides, D and D′, which are kept tight and in place by the clamps, C and C′, which are made of wood, and fastened with thumb-screws, as seen in the figure.

To use the attachment all that is necessary is to put three screws through an ordinary printing-frame, to correspond with the holes for the same in the attachment. The attachment is then put on, and the guides of brass are fastened with the thumb-screws, and the vignette opening of proper size is slid into its position. The whole is then fastened by tightening the thumb-screws. When the thumb-screws are loosened, the guides can be moved in any way, up or down, or sideways, and *vice versa.* It is easily worked, and can be attached or detached in a few seconds.

The following is a description of still another plan of vignetting, which is not new to many of our readers, but may be useful to some of them. We extract it from the British Journal:

"A sheet of stiff card-board of exactly the size of the negative is obtained; this is laid down over the negative when placed film lowermost. This card being drawn to one side, so as to disclose the figure, the position of the head, and so much of the body as it is desirable to introduce, is marked by a pencil on the edge of the card. These marks, being carried across the card by means of a ruler and pencil, give two lines showing the vertical position of the aperture. The card is again superimposed on the negative, and moved down so as to show the width of the head or body, and two marks made, subsequently extended into two vertical lines, as in the case of the other marks. In the square thus formed an aperture, previously roughly designed by pencil, is cut by means of a sharp-pointed knife on a piece of wood. On the card thus perforated, another piece of rather larger size than the aperture is gummed, in which a similar aperture to that in the sheet is made. This piece should be about twice as thick as ordinary mounting board. The aperture hav-

ing been bevelled inwards, a square of tissue-paper is gummed down over it, and a hole cut into it of a shape corresponding to the aperture, but at a distance from the edge of about one-sixteenth of an inch. A second sheet of tissue-paper is placed over the first one, and so on until six or seven have been pasted down, an aperture rather smaller in size than that on which it is pasted down being cut in each before it is, in turn, is covered over. This gives a soft and beautifully graduated edge, which confers the same quality on the print produced by its instrumentality. A print from the negative is now pasted on a convenient portion of the vignetting board, by which to recognize it when wanted, and the arrangement is complete."

The method of making vignetting masks by layers of paper is well known to many; but we are not aware of any one in the habit of making special masks for each negative. The plan of making a mask for each negative would never do in this country. *Ed. Phil. Pho.*

PHOTOGRAPHY AMONG THE INDIANS.

Fort Laramie, June 30, 1866.

Dear Journal: I have been in this wild region nearly a month, taking scenes in connection with the Treaty that has just been made with the Sioux, Arapahoes, and Cheyennes, and have secured twenty-two good negatives to send our friends, Wenderoth, Taylor & Brown, that will illustrate the life and character of the wild men of the prairie. I did what I could for the Journal in Indiana, Omaha, and Nebraska, and hope I obtained some subscribers. Here I can do but little, as but few people know much about the art. There was a Mr. and Mrs. Laramie who used to take a mean style of ambrotypes here, but he died, and she was captured by the Indians, and, after suffering many hardships, escaped and returned to the States. Excepting the Indian life, the scenery here away is nothing to boast of, but it is more imposing as we go toward the Rocky Mountains. They are in sight, but so distant and blue that they defy my skill. I had much difficulty in making pictures of the Indians at first, but now I am able to talk to them, yet I get pretty much all I want. The water is muddy, and out of fifty negatives I have taken, I shall only publish prints from twenty-two. They will come in with the Commissioners. They return on the 2d of July. I have succeeded very well with Indian ponies as you will see. I expect to leave here next week, and go on to Fort Reno with Colonel Carrington's Expedition. He, with the Eighteenth Regiment, is establishing posts along the Powder River road to the Yellowstone River. My next move (one hundred and eighty miles) will take me to the Mountains where I shall revel in a superabundance of magnificence and grandeur. With Major Brigers, the pioneer of the Northwest, I expect to travel, and trap this fall, and spend the winter in Virginia City, Montana, and to secure some winter Rocky Mountain scenery. My prospects for visiting all the Territories are at present very favorable, and I hope to make my talents for making negatives available to science. When I get to Virginia City, I hope to forward some whole size negatives to you for publication; but as I am situated at present, must confine myself to making only stereoscopes. I have found that a little oxalic acid will enable one to use hard water for the silver bath, if added carefully until all the lime is precipitated as oxalate, and then the water is filtered, and does not interfere, if in a little excess, with the working of the bath. This country is sandy, and we have a spring of excellent water near the Fort. Both the Platte and Laramie River water are pure enough, but full of sand as the currents are very rapid. As I cannot carry spring-water far to wash the negatives with, I have difficulty in making perfectly clean work, but have made some that are all I could desire.

Some of the Sioux think photography is "pazuta zupa" (bad medicine). To-day I was over trying to take the Wahcopomony at the great Brulie Sioux village. The wind blew so hard I could not make but one passable negative, though I had some of the most interesting scenes imaginable. Here the division of the presents from the Government, was made and some 1200 Sioux were arranged, squatting around the Commission-

ers in a large circle, three rows deep. The village embraces more than 200 tribes (lodges) led by "Spotted Tail," "Standing Elk," "The Man that walks under the ground," and "Running Bear." "The Man that walks under the ground" is a good friend of mine. He and the "Running Bear" have had their pictures taken. I have been introduced to the other two, and they are friendly. So I took all I chose, or rather all I could after the wind subsided towards evening. The camp presented a lively scene. They have just moved it up to the junction of the Platte and Laramie on the north side of the Platte, and arranged it so as to inclose a half mile inside their tents to secure their horses, which they herd in the day-time, and drive in at night. Some 500 ponies were pasturing around, and the scene was novel and beautiful, with the river on the south. They are in the middle of a valley, two miles wide, closed in by swells of sand and gravel, 200 feet above the river. The valley is sandy, yellow with the bloom of a dwarf species of sun-flower interspersed with white moss flowers, yellow cactus, and a white variegated thistle, that bears a large white flower. The river is fringed with cotton woods, and the hills bare and bleak. I did at last get a tolerably good negative after working hard nearly all the afternoon. Towards night, about 100 Indians came out on horseback, and I witnessed three match races of about as fast horse travelling as I wish to see, and the riders far wilder than the horses. Some of the Indians think they will die in three days, if they get their pictures taken. At the ferry to-day I pointed the instrument at one of that opinion. The poor fellow fell on the sand, and rolled himself in his blanket. The most of them know better though, and some I have made understand that the light comes from the sun, strikes them, and then goes into the machine. I explained it to one yesterday, by means of his looking-glass, and showed him an image on the ground glass. When he caught the idea, he brightened up, and was willing to stand for me. I make them Ferrotypes, and put brass around them, and they think they are *wash-ta-le-poka*. (Their superlative for good.) I anticipate making a picture from the hills to-morrow, taking in the whole camp (a solar, if I can). They are to come in to-morrow to bid the Commissioners good bye. I expect, then, to take the Fort from across the Laramie.

Truly, your friend,

RIDGWAY GLOVER.

P.S. July 2d. I got a good picture of the Fort this morning, and this afternoon I happened to be present when Colonels McLean and Thomas Wistar were distributing the goods to the Chiefs, and although the interpreters were discouraged, and the Indians seemed unwilling, Thomas and McLean at last persuaded them to sit, and I got a stereoscopic group of six Ogholalla, and eight Brulie Sioux. The wind was blowing, and the sand flying. The negative is, therefore, not quite clean, but all the likenesses are good, and they can be readily recognized. They are,

BRULIES.

"Spotted Tail,"	"Swift Bear,"
"Dog Hawk,"	"Thunder Hawk,"
"Standing Elk,"	"Tall Mandan,"
"Brave Heart,"	"White Tail."

OGHALOLLAHS (THEY PRONOUNCE IT).

"The Man that walks under the ground,"
"The Black War Bonnet,"

"Standing Cloud,"	"Blue Horse,"
"Big Mouth,"	"Big Head."

The Signers of the Treaty.

I will try to send you a letter every month now. Yours, truly,

R. G.

As will be seen by his letter, and as we announced some months ago, our correspondent, Mr. Glover, is on a photographic expedition through the great West and Northwest. It is his intention to take pictures of the most interesting scenes and localities along the route. His negatives will be sent to Messrs. Wenderoth, Taylor & Brown, of our city, who will print from them, and have copies for sale.

We hope Mr. Glover will secure something excellent and interesting to illustrate our Journal. We commend him to the good will and fraternal courtesies of the craft wherever he may meet them, and hope we shall have a frequent letter from him as he journeys along. We are glad to know that his success is no longer a matter of solicitation. ED.

Mr. R. J. Fowler, correspondent of the "British Journal," remarks, that "Herr Rabendung's portraits from retouched negatives, carte-de-visite size, were sold at eighteen shillings per dozen, and that he used a moist, transparent red color for the retouching, stippling it in very carefully in minute dots. I saw a curious photograph in this artist's waiting-room. It was a full length carte-de-visite portrait of a gentleman, front view; and on the back of the card was pasted the portrait of the same person in the same position, but taken from his back, and this being reflected in a little piece of looking glass placed in front of the back picture, you saw the whole of the gentleman at one glance, both front and back view." The same gentleman, writing from Paris, says, that his "attention was arrested by the prospectus of a photographer, in which he set forth that he would be happy to accommodate intending clients by receiving the money for their portraits by subscriptions of from one penny to a franc per week; that he would collect subscriptions at the houses of his clients, giving receipts for the same; and that as soon as one-half of the total sum was paid, he would proceed to take their photographs."

This is enterprise almost equal to that of a defunct stock-dealer in our country, who advertises eight cartes for a dollar, and a colored porcelain picture for the same sum, and of another who makes sixteen ferrotypes for twenty-five cents. Oh! why degrade our art so? Better leave it, with a good name, and go at something else. The time is soon coming, however, when *good* work will always have the preference, and low prices will be no inducement.

New Feature in Banking.—A gentleman recently called at one of the banks in Brisbane, and presented a letter of credit for a considerable amount from a bank in Melbourne. The usual plan adopted by the banks in such cases is to require the party presenting the letter to get a customer of the bank to identify him; but in this case such a requirement was unnecessary, as the manager of the bank held a carte-de-visite of the gentleman referred to, which served the purpose of identification, and the money was at once placed to his credit.—*Warwick Argus.*

We find that photography was used for the illustration of books as early as 1851, when a work called "Italie Monumentale" was issued in France, profusely illustrated in that way.

It is to the nephew of M. Niepce that we are indebted for the discovery of the use of albumen in making photographs upon glass.

Photography in the Mammoth Cave by Magnesium Light.

Mr. Editor: Ever since the introduction of the magnesium light as a photographic agent, it has been one of my pet projects to test its capabilities as such in the celebrated Mammoth Cave. A short time ago, the opportunity presented itself to me to do so. Two gentlemen who had secured the exclusive right to make photographs in the cave, applied to me to make a number of negatives of the principal objects of interest to be found there.

As my experience with the magnesium light was very limited, having only made a few portraits by its means, I proposed to these gentlemen that I should make an experimental trip to ascertain what could be done, after which I would contract with them for any number of negatives they should wish. I had little doubt of the success of the undertaking, but I feared that the cost of the light would be so great that the enterprise would not prove remunerative to them.

The experimental trip being agreed to, I started from Cincinnati by the 12 o'clock Louisville boat, took the train at 7 A.M. for Cave City, and from there, after three hours' riding in the stage, arrived at the Cave Hotel, within a few hundred yards of the Mammoth Cave.

The next morning was devoted to exploring part of the Cave, and selecting a few spots to try our skill upon. The light we had, that of a few lard oil lamps, was, however, so weak that to make a selection was exceedingly difficult. In the afternoon I began operations. As the object was not so much to make pictures of the most im-

portant parts as to test the capabilities of the magnesium light and the quantity of the metal to be used, it was unnecessary to travel very far in the Cave, where, however, the most interesting spots and objects are to be found. I then began operations in what is called the Gothic Chamber, situated about one mile and a half from the entrance.

And now a few words as to my outfit. The lenses used were a pair of T. Ross's No. 2, carte-de-visite lenses of 4½ inches back focus, and very suitable for stereoscopic pictures. They were mounted on a French stereoscopic camera at a distance from centre to centre of about 3½ inches.

The collodion was made as follows:

Ether, ...	48 ounces.
Alcohol, ...	48 "
Helion cotton No. 1, . .	1 "

Six ounces of the collodion were iodized with two ounces of the following solution:

Iodide of ammonium, . .	3 ounces.
Bromide of cadmium, . .	1 "
Alcohol, ...	66 "

The silver solution was made with 24 ounces of Ohio River water and 2 ounces of pure nitrate of silver. Half of it only was iodized. It was sunned for a short time, filtered again, and acidulated with one drop of nitric acid.

The developing solution was made as follows:

Sulphate of iron and ammonia,	2 ounces.
Acetic acid, ...	4 "
Water, ...	60 "

The hyposulphite solution was one which had been used for fixing prints, and had been concentrated by evaporation.

The American Magnesium Company had furnished half a pound of tapers and several so-called photographic screens or reflectors. The tapers were composed of two ribbons and one wire around which had been twisted a double iron wire. About thirty-five of them made one ounce of magnesium. The iron wire is for the purpose of causing the combustion to be slower and more regular. I was, however, inclined to think that it interfered with the intensity of the light. The intense light of the burning magnesium beng caused by the state of white heat to which are brought the small particles of oxide of magnesium which are formed, it may be, that the caloric expended on the heating and melting of the iron is so much taken away from the magnesia. However, experience proved that the iron wire was quite necessary, for, when I attempted to burn at one time a large number of tapers without it, I found that a quantity of the magnesium would melt, fall, and burn in the bottom of the reflector. The first picture I attempted was of a stalactite, about six feet in diameter in its widest part. I used eight tapers, which were found to be insufficient, and another trial was made with fifteen. These gave a fair negative. A third trial being made with about twenty-five tapers used in two reflectors, I obtained a negative with which I was quite satisfied. The second subject was a group of stalactites, situated at about sixty feet from the first. Quite a good negative was produced by lighting with about twenty-five tapers. The success obtained so far made my companions, the gentlemen who employed me, quite enthusiastic and ambitious, and they induced me, somewhat against my judgment, to attempt a large subject. The one we picked out was a large hall in the main Cave, with rocky sides, and large rocks covering the ground. One of these of tremendous size had, when seen from a certain point by the dim light of torches, the appearance of a coffin, and is, for that reason, called the *Giant's Coffin*. The resemblance to a coffin is not quite so striking, however, when seen by magnesium light. In this place we made two exposures. For the first exposure we used thirty tapers, and obtained only an image of the high lights. The second exposure was made by the light of fifty tapers. This gave us an under-exposed positive. We left the place in disgust, promising ourselves to try again under better conditions. The few exposures I made had taught me what these conditions were, and if my companions had not been anxious to secure a few more negatives, I might have stopped my experiments until appliances could be got ready better than those I had. However, I went on and made five more negatives. One of these would have been excellent as to illumination and

exposure, if the magnesium had burned all at one time; but I was obliged to apply the light several times, thus giving time to the smoke to collect on the ceiling, and giving to the person who is represented as coming through a narrow passage the appearance of having his head in a cloud. Another negative representing the surroundings of the bottomless pit was underexposed, though it makes a passable print. We burned our last magnesium to produce it.

The difficulty of burning a large quantity of magnesium without being inconvenienced by the smoke, and the great cost of the metal, compelled me to use always large diaphragms. Those I used were $1\frac{3}{8}$ inches in diameter. Single lenses, the Globe, and all other lenses in which the spherical aberration and other defects are corrected by the use of small stops, would therefore not answer the purpose. Combination lenses of short focus, giving both rapidity of action and a fair definition of objects, situated at different planes, are most suitable for this kind of work. The lenses I used, although quite fair in both respects, do not produce a picture including a sufficiently wide angle of view. Of all the lenses which came under my notice, Dallmeyer's stereoscopic lenses are those which, I think, will answer best. They have a longer focus than the stereoscopic Globes (3 inches), but admit of being used with a large aperture, and take in quite a wide angle of view on the stereoscopic plate. If any optician who may happen to read this makes or can make a lens better suited for the purpose in view, I would be obliged to him if he would communicate with me through *The Philadelphia Photographer*.

The reason why I had to use such quantities of magnesium is, that the screens or reflectors furnished by the American Magnesium Company threw the light in an angle, about three times wider than the one included in the picture. This was an inconvenience which, far removed as we were from a tin-shop, we could not remedy. That style of reflector is, however, the one to be used, for I think it would be hardly practicable to construct a reflector with the necessary appliances to pay out in a short time a quantity of ribbon or wire, sufficient to make a picture under the conditions in which I was working; for it is necessary that all the magnesium which is to be burned to obtain an image should be burned in the shortest possible time, in order to prevent the smoke from obscuring the objects to be represented. The reflectors I am getting made now have the same form as those of the Magnesium Company, but are more concave, and with sides extending further. The strip of tin to which the tapers are suspended is also nearer the back part of the reflector.

In a few days, I will start again to the Cave, and, I trust, will not come back without securing from fifty to a hundred negatives of the principal objects of interest. I think that with the new reflectors I am getting made, I will only have to use one-third or one half of the magnesium I used before, working with the same aperture of the lenses. I intend to take with me three cameras: one stereoscopic one with the Dallmeyer lenses, another one with the Ross lenses, and a 4-4 camera with a 4-4 short focus Voigtlander lens. I will thus be enabled to make three exposures at one time.

In exploring the Cave to find the objects I wished to photograph, and making a selection of a point for the camera, and of one where to burn the light, a good deal of magnesium was used up. This time I will take with me several pounds of Bengal light composed of nitre, sulphur, and sulphide of antimony. Some magnesium was also used in focussing, but I found out that by disposing five or six lamps at different points, I could focus just as accurately on the flames.

I will take pleasure in communicating to *The Photographer* the result of my next trip.

CHARLES WALDACK.

CINCINNATI, July 14, 1866.

Previous to the receipt of Mr. Waldack's very interesting letter, he favored us with prints from the negatives he describes above. We think that, if Daguerre and Niepce were here, they would weep. These pictures now lie before us, and are the *most wonderful* ones we have ever seen. We can scarcely remove our eyes from the instrument, or lay them down to write, for perfect wonder. Oh! is not Photography a great power? What else could creep into the bowels of the

earth, and bring forth such pictures therefrom as these? It hardly seems possible. Daguerre never dreamed of it. Five years ago we would have laughed at it, and to-day we can scarcely believe what we see. Great rocks, giant stalactites, wondrous caves within caves are here before us almost as plain as though we were near and in them. If Mr. Waldack modestly considers these mere experiments, we have much to hope for from his next trials. He has our most earnest wishes for his success, and no doubt it will be most eminent and satisfactory. He has found out by actual experiment what is needed, and everything requisite is tō be employed to make the success perfect. We hope, through his great kindness, at some time, to present our readers with a substantial and beautiful proof of his labors.

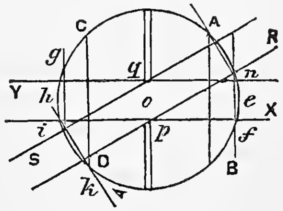
ZENTMAYER'S NEW LENS.

BY PROF. HENRY MORTON, PH. D.

The new photographic lens invented by Joseph Zentmayer, of this city, is of the greatest interest, not only in a practical sense, because it is a most excellent and efficient instrument, which can be constructed at less than half the cost of any other equally good combination, and possesses other like advantages of lightness, compactness, adjustability, &c., which will be more fully stated hereafter, but in a scientific point of view also, because it involves new principles and new applications of optical laws.

The theory of this lens may be best explained by the following progressive illustrations:

Fig. 1.

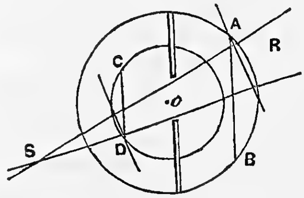


Let A B and C D represent two plano-convex lenses exactly alike in every respect, so placed that their outer surfaces form parts of the imaginary sphere, A C D B, and with a small opening, *p q*, in a central diaphragm. Neglecting for a moment the bending of rays by refraction, we see that the only rays which can pass the diaphragm are those which come normally upon the outer surface, as X Y and R S. Supposing sections to be made in the direction of the chords, *n f*, *g i*, we see that the ray, X Y, will be subjected to the action of two small lenses, *n e f*, *g h i* (limited by the size of the diaphragm), and two blocks of parallel glass. The aberration, spherical and chromatic, may therefore be regarded as that only which is due to two such extremely minute lenses.

Turning again to the ray, R S, and supposing similar sections, A *n* and *i k*, we have the ray again acted upon by two small lenses like the first, but in this case traversing two prisms. As, however, these are exactly equal and opposite, they will correct each other; and the aberration in this, as in the former case, will be such only as is due to the two small lenses. We are here speaking, it must be remembered, only with the purpose of explaining a general principle, and without regard to accuracies of detail, which would confuse the subject, as we think.

In this preliminary illustration we have made no account of the *deflection* produced by the first prism, nor of the *concentration* due to the little lens. To meet the first, the diaphragm is moved a little forward from the centre, O, and for the second, in place of the large lens, C D, a smaller one of shorter radius is so placed that its outer surface is practically concentric with that of A B. (See Fig. 2.)

Fig. 2.

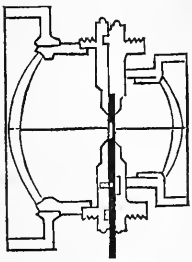


The converged ray thus finds in C D an equivalent opposite prism to that it traversed in A B, and is only subject to the aberrations due to the two small lenses, now of *unequal* curve.

Thus far the general principle by which a lens of very small aberration may be made with only one kind of glass, or without *correction*, has been treated.

Such a combination, however, as that last described would be of little value, because of its very short focus, and want of flatness in field. To remedy these difficulties, in place of plano-convex, meniscus lenses are used (as shown in Fig. 3), whose inner

Fig. 3.



curves are to their outer ones as thirteen is to twelve. The curves of the two lenses are to each other as three to two in all cases. Any variety of combinations and series of focal lengths might be constructed on the above principle, but the plan adopted is as follows: The most complete set consists of six lenses, whose focal lengths are—

I.	5.333 inches.	IV.	18 inches.
II.	8 "	V.	27 "
III.	12 "	VI.	40.5 "

These may all be successively arranged in the same mounting, giving combinations with focal lengths and circular fields at 90° as follows.

Lenses I and II give a focal length of 3.55 inches, and field 7 inches diameter.

Lenses II and III give a focal length of 5.33 inches, and field 10½ inches diameter.

Lenses III and IV give a focal length of 8 inches, and field 16 inches diameter.

Lenses IV and V give a focal length of 12 inches, and field 24 inches diameter.

Lenses V and VI give a focal length of 18 inches, and field 36 inches diameter.

Thus, with six lenses and one mounting, five different instruments may be successively adjusted in as many minutes, the mounting being so arranged as to fit into the camera either way. To pass from one focal length to the next longer in the series, it is only necessary to take out the smaller lens, and put in its place the second size above. Thus, to change eight inches into twelve, lens No. III is replaced by No. V, and the mounting reversed. A little shutter, close to the central diaphragm, serves for "exposing" in place of a cap; and a diaphragm plate is arranged with three holes for each combination, a large one for focussing, a middle size for quick work, and a small one for fine and difficult work; for it is one of the merits of this lens that a large stop may be used for focussing, and a small one thrown in for the exposure, with not only good, but the very best effect.

In these lenses the visual and actinic foci appear to coincide, so that no adjustment after focussing is needed. The field is very equally illuminated, because, no doubt, as will be seen from Fig. 1, the marginal rays, as well as the central, are normal to the first surface, and do not lose unequally by reflection. The depth of focus is most remarkable, and for quickness of work surpasses that of any like instrument. Excellent views have been taken in fifteen seconds on a bright, and thirty seconds on a dark day.

PHOTOGRAPHY IN GERMANY.

BERLIN, June 25, 1866.

DEAR SIR: There has not been much photographic intelligence to communicate lately. The Germans are now occupied with a great war, which has divided our fatherland into a Northern and Southern section, like the great war in the United States, which ended so successfully for the North. We hope that the same will be the case in Germany. Some interesting communications in the Berlin Photographic Society were recently made, which I will report to you. Mr. Beyrich is now manufacturing a new photographic paper called "gluten paper," which is like the "amorph" albumen paper, and produces quite as brilliant a picture as that. It is excellent for retouched images, for the ordinary water colors adhere to it much better than on albumen. When silvered, it keeps white a long time, and contains no sulphur, which, as regards its permanency, appears to me of great im-

portance. The treatment is exactly the same as for albumen paper; yet it has the advantage, that it can be supplied in much more even proportions, and consequently will not give occasion for such frequent complaints.

Another kind of paper is now announced in France, called "*papier lithographique.*" It is sold *silvered*, and keeps very well in this manner some weeks. The inventors are two Spaniards.

I have shown the excellent picture in the Number 29 of *The Philadelphia Photographer*, in the Photographic Society, and it has been much admired by all artists. It is the most charming of all outdoor photographs made indoors that I have ever seen. In my last letter I wrote to you of the decision of the commission elected by the Photographic Society to examine the merits of the Periscope and Pantoscope lenses, and that they reported in favor of the Pantoscope. In the intermediate time, another eminent optician, Mr. Dallmeyer, has worked out a new wide-angle lens, which defines about 100°, and is quite achromatic, and without distortion. You already know of Dallmeyer's old "wide-angle landscape lens." This little objective has only an angle of view of 64°; but it is, of all the wide-angle lenses which I have tried, the most actinic, and I use it, therefore, for taking interiors with the best success. The little distortion is not important.

The *gelatine chromatic relief*, which is so important in the process of Woodbury, has been lately applied here to the productions of the so-called Lithophanica. Mr. Meydenbauer shapes this in porcelain, and then burns it, by which means a complete transparency is obtained, which is very charming.

Mr. Krüger has lately given a very interesting explanation of the *origin of sulphuric acid* in the silver baths. There are in the trade several kinds of filtering paper containing salts of sulphuric acid in great quantities. Mr. Krüger sent me the eighth part of a sheet of his filtering paper, which contained so much of sulphuric acid that pure water filtered through it gave a very noticeable precipitate with nitrate of barium. This sulphuric acid is evidently a residuum from the bleaching process. To remove the last trace of chlorine the paper must, of course, be treated with hyposulphite of soda (antichlor), which is thus changed into sulphate of soda, and remains partly in the paper.

One of the most common evils in photography is the *splitting of the collodion film* on varnished negatives. It was mentioned formerly that this splitting would only take place on mirror glass (plate glass); but it is stated that even common glass exhibits this failure, and that dampness especially gave rise to it. Mr. Stiehen, a very able photographer, covered a half part of an old varnished negative with damp blotting-paper, and let it rest several hours; on this damp part arose splits, whereas the other part remained unharmed. It is remarkable that these splits can in no way be removed, whilst splits on mirror glass disappear by the action of alcohol or ether, and even by simply heating the plates.

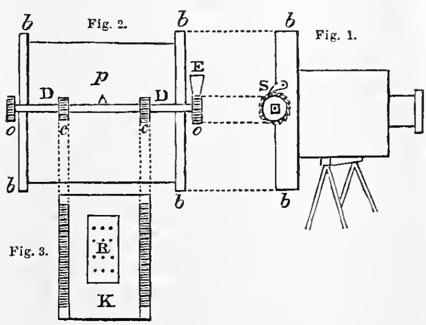
In one of the last meetings of our Photographic Society the cause of the *spontaneous drying of wet collodion plates* was discussed. This circumstance is, of course, of great importance in taking interiors, where exposures of half an hour are not rare. There are cases in which plates allow remarkably long exposure without preliminary precautions, *i. e.*, my friend Nickel, a very clever photographer here, used, in the production of an oil picture, *one hour and a half*, with a wet plate, without observing any failure in the development. Many others, however, complain of dry spots in exposures of only a few minutes. As remedies, the use of a collodion without cadmium salts, and the placing of wet cloths in the camera, have been recommended. Both are only partly successful. Of late, I had to contend much against dry spots when using not quite fresh silver baths, with ten per cent. of nitrate of silver. The spots, however, disappeared after diluting the baths in the proportion of ten to twelve. I have also made attempts with other old baths which gave dry spots, and found that this evil can be removed by dilution. It is remarkable that often quite freshly prepared baths very easily give dry spots.

In connection with this long exposure another drawback appears, that is, the *infiltration of the silver solution in the wood* of the

dark slide. It is curious how strongly, after being used a short time, the wood of the dark slide becomes impregnated with silver solution. I plunged, as a trial, the dark slide of a stereoscopic camera, which had been used for eight weeks, in hot water, and thus obtained a pint of coffee-brown liquid, which reacted considerably on silver. After long exposure, these substances contained in the wood strike into the spongy collodion film, and occasion on the development the moss-shaped designs which spoil many beautiful plates. In order to obviate this inconvenience, I have, after a thorough cleaning of my dark slides, dipped them with the corners into melted paraffine. Paraffine is known to be one of the (chemically) least sensitive organic bodies, and its use here is on that account of great advantage. These dark slides then remained in an excellent condition, and have since then been so preserved.

In Number 27 of the "Mittheilungen," you will see a diagram of a very simple and interesting apparatus for making medallion portrait cartes.

Inclosed I send you the description in German. I do not know the technical terms in English exactly, therefore I do not translate it. I hope you will translate it better than I can.



The camera (Figs. 1 and 2), consists mainly of a draw-box, with frame, *b b*, for the plateholder and ground-glass. A grooved shaft (Fig. 2), D D is attached to the frame, *b b*. With this shaft, two pinion-wheels, c c, are connected, which work into the racks, fastened to the plateholders. If the shaft is turned by the buttons, *o*, the plate-holder will be raised or lowered in any required position, and their position retained by the ratchet and wheel, S (Fig. 2). Both the pinions, c c, are movable on the shaft, D. The plateholder, K (Fig. 3), may be placed in any position by such an arrangement. To make different exposures in a required order, the back of the plateholder, K, is provided with a corresponding pattern, R (Fig. 3), and the plateholder moved by the racks and pinions, until the pin (index), *p*, which is fastened to the middle of the shaft, D D, and precisely in the optical axis of the lens, corresponds with a required point of the pattern; then the plate is exposed, shut, the plateholder moved to another point corresponding with the pattern again exposed, &c.

Dr. Reissig has lately, published a series of *new researches on the sensibility of iodide of silver*, which is important in regard to the question, whether iodide of silver suffers by light a chemical decomposition or not. You know the difference in the opinions on this point of my excellent friend, Mr. Carey Lea and myself. I willingly concur with Mr. Lea concerning the photographic sensibility of pure iodide of silver, which, without suffering a chemical decomposition, yet produces a developable picture; and Dr. Reissig's experiments have proved the correctness of this fact. It is, however, otherwise in the presence of bodies which absorb iodine. I have spoken the opinion, that in these cases the iodide of silver undergoes a chemical decomposition in regard as all the body, which chemically absorbs iodine, acts as sensibilizers, *i. e.*, arseniate of soda, ferrocyanide of potassium, nitrate of silver, &c. Many persons have made the objection against my theory, that I have never proved the really chemical decomposition of the sensibilizers if they are exposed to light with iodide of silver. Dr. Reissig has examined these points, and found that the solution of silver, exposed to light with iodide of silver, is decomposed in absorbing iodine, and that a subiodide of silver is formed, whilst oxygen is set free. Also, Dr. Reissig has discovered that, by lighting iodide of silver under a solution of ferrocyanide of potassium, iodine is absorbed by the latter in forming iodide of potassium. By this experiment, I believe, is decided the question on the *chemical* de-

composition of iodide of silver *when exposed under the sensibilizer* before named.

Yours, very truly,
H. Vogel, M.D.

ANCIENT PHOTOGRAPHY.

PART I.

We have been asked many times to republish the formulæ of olden times, as some suppose that they are really better than those now generally practised. We have so much original matter continually pressing upon us that we have been unable to spare any space for republishing what appeared in print years ago, but the pressure has now become so great in the other direction, too, that we have concluded to yield, and as we are able, from time to time we shall publish a series of papers which we shall call *Ancient Photography*, and which our readers must all agree to become greatly interested in.

We shall begin with the first announcement of the discovery of Daguerre in our country, republish many of the papers written early upon the subject, and it may be some of the drawings of the early apparatus used. If any grow tired before we finish, they will please tell us, and if we omit anything, or fall into error, we shall be glad to be corrected. Our desire is to please all of our readers, draw them near to us, and to draw near to them. If they will read these papers carefully, they will, as we have done, find much to amuse and instruct them, and a great deal that they, as disciples of the art, ought to know. We certainly think that all will agree as we progress that photography is, truly, a great art, and wonderfully progressive.

An account of the difficulties that our fathers in Art encountered, the discoveries they made, their odd ways of working, their discussions, their jealousies, remarks, &c. &c., will all be found interesting, and without further introduction we begin our Part I, Ancient Photography, with a paper published in March, 1839, in the London Athenæum, entitled "Photogenic Drawing."

"The subject (says Mr. Talbot) naturally divides itself into two heads,—the preparation of the paper, and the means of fixing the design. In order to make what may be called ordinary photogenic paper, the author selects, in the first place, paper of a good firm quality, and smooth surface; and thinks that none answers better than superfine writing-paper. He dips it into a weak solution of common salt, and wipes it dry, by which the salt is uniformly distributed throughout its substance. He then spreads a solution of nitrate of silver on one surface only, and dries it at the fire. The solution should not be saturated, but six or eight times diluted with water. When dry, the paper is fit for use. He has found, by experiment, that there is a certain proportion between the quantity of salt and that of the solution of silver which answers best, and gives the maximum effect. If the strength of the salt is augmented beyond this point, the effect diminishes, and, in certain cases, becomes exceedingly small. This paper, if properly made, is very useful for all ordinary photogenic purposes. For example, nothing can be more perfect than the images it gives of leaves and flowers, especially with a summer sun. The light passing through the leaves, delineates every ramification of their nerves. If a sheet of paper, thus prepared, be taken and washed with a saturated solution of salt, and then dried, it will be found (especially if the paper has been kept some weeks before the trial is made), that its sensibility is greatly diminished, and, in some cases, seems quite extinct. But if it be again washed with a liberal quantity of the solution of silver, it becomes again sensible to light, and even more so than it was at first. In this way, by alternately washing the paper with salt and silver, and drying it between times, Mr. Talbot has succeeded in increasing its sensibility to the degree that is requisite for receiving the images of the camera obscura. In conducting this operation, it will be found that the results are sometimes more, and sometimes less satisfactory, in consequence of small and accidental variations in the proportions employed. It happens sometimes that the chloride of silver is disposed to darken of itself, without any exposure to the light—this shows that the attempt to give it sensibility has been carried too far. The object is, to approach to this condition as near as possible,

without reaching it; so that the substance may be in a state ready to yield to the slightest extraneous force, such as the feeble impact of the violet rays, when much attenuated. Having, therefore, prepared a number of sheets of paper, slightly different from one another in the composition, let a piece be cut from each, and, having been duly marked or numbered, let them be placed side by side in a very weak diffused light, for about a quarter of an hour; then, if any one of them, as frequently happens, exhibits a marked advantage over its competitors, Mr. Talbot selects the paper which bears the corresponding number to be placed in the camera obscura.

"With regard to the second object—that of fixing the images—Mr. Talbot observed, that, after having tried ammonia, and several other reagents, with very imperfect success, the first which gave him a successful result was the iodide of potassium, much diluted with water. If a photogenic picture is washed over with this liquid, an iodide of silver is formed, which is absolutely unalterable by sunshine. This process requires precaution; for, if the solution is too strong, it attacks the dark parts of the picture. It is requisite, therefore, to find, by trial, the proper proportions. The fixation of the pictures in this way, with proper management, is very beautiful and lasting. The specimen of lace which Mr. Talbot exhibited to the Society, and which was made five years ago, was preserved in this manner. But his usual method of fixing is different from this, and somewhat simpler—or, at least, requiring less nicety. It consists in immersing the picture in a strong solution of common salt, and then wiping off the superfluous moisture, and drying it. It is sufficiently singular, that the same substance which is so useful in giving sensibility to the paper, should also be capable, under other circumstances, of destroying it; but such is, nevertheless, the fact. Now, if the picture which has been thus washed and dried, is placed in the sun, the white parts color themselves of a pale lilac tint, after which they become insensible. Numerous experiments have shown the author that the depth of this lilac tint varies according to the quantity of salt used, relatively to the quantity of silver; but by adjusting these, the images may, if desired, be retained of an absolute whiteness. He mentions, also, that those preserved by iodine are always of a very pale primrose yellow, which has the extraordinary and very remarkable property of turning to a full gaudy yellow whenever it is exposed to the heat of a fire, and recovering its former color again when it is cold."

Now disputes arise, and soon after we find the following in the Mechanics' Magazine:

"*Invention of Photogenic Drawings.*

"It appears from an article in the London Athenæum, that a M. Niepce had entered upon the investigation of this mode of copying, quite as early as M. Daguerre. The former was in England, in 1827, and left with some of his friends there several specimens of his execution, nearly as perfect as those now produced. It appears, however, that 'he was long and zealously assisted by M. Daguerre, who had been many years engaged in similar pursuits; and there is legal proof that, so early as 1829, they entered into an agreement, by which they declare themselves '*associés pour exploiter le procé dé á l'invention du quel ils avaient concuru l'un et l'autre.*'

"But the most curious fact (adds the Athenæum), in relation to this discovery remains to be told. It would appear, considering the character of the pictures, all but impossible that impressions from them could be multiplied after the manner of an engraving; M. Daguerre, indeed, stated to us that it was impossible, and it is but reasonable to believe that he is as fully informed of the nature and extent of the discoveries as M. Niepce himself. Yet, in 1827, M. Niepce not only declared that it was possible, but produced specimens of such multiplied copies, and Mr. Baner has now in his possession, not only copies of engravings, fixed permanently by the action of light, not only scenes from nature, but metallic plates engraved, and engravings copied from them: and he understood and believes that no engraving tool was used, but that the drawings were fixed by the action of light, and the plates subsequently engraved by a

chemical process, discovered by M. Niepce. If so, the greatest secret of all remains yet to be made public, and is, we believe, as unknown to M. Daguerre as to others."

Now we have an extract from an English journal, which is quite interesting as a matter of history, on

"*Light Drawn Pictures.*

"Our vivacious Parisian neighbors have certainly the facility of making the most, in words, of anything they chance to lay hold of. 'M. Daguerre's ingenious discovery,' says the Paris correspondent of the Post, 'which has assumed the name of 'Daguerreotype,' continues to excite very great curiosity and admiration. It is affirmed that the Emperor of Russia has offered 500,000f. for his secret, and that he has declined the munificent reward. It is not likely that his friend, M. Arago, will succeed in obtaining a larger national one from the Chambers. Mr. Talbot's communications to the Royal Society have made the processes public property here, had they not been so before. Sir John Herschel has turned his attention to the subject, and has already obtained pictures from the light of Daniell's great galvanic battery; Sir David Brewster, too, has commenced an investigation into the matter."

(To be continued.)

BROMIDE PAPERS.

Bromide of potassium still seems to worry some of our readers. We have been almost overwhelmed with it, and trust these shall be our last remarks upon it. In future, our readers must refer to our back pages for information concerning it. Many who have settled with the assignee are complaining that others were allowed to go free. We wrote to Mr. Hubbard, asking how such things could be, and have received the following reply from him:

"New York, 71 Broadway, July 10, 1866.

"E. L. Wilson.

"Dear Sir: You say that many photographers are taking ground against the 'Bromide Patent,' because delinquents have not been generally prosecuted, and inquire whether it is really intended to do so. Although you have been an opponent of the patent, yet the candor and thoroughness of your investigations make me believe that you are anxious only for the right; and I, therefore, reply, that they will be assuredly called to account, so soon as the general canvas can be completed. The *recusants* will then receive *exclusive* attention, and will learn that stupid obstinacy and a determination to resist are but frail obstacles to the legitimate claims of the patent.

"Yours, respectfully,

"T. H. Hubbard,

"Assignee Bromide Patent."

We think this ought to make those who have paid feel reassured and glad that they will have no further trouble.

In trying to help those to evidence against the patent, who were about to resist it, we stated that we hoped to receive what would be the last on that score from England. From our friend, Mr. G. Wharton Simpson, through Mr. John Carbutt, of Chicago, we have received dilapidated copies of "A Manual of the Collodion Photographic Process," by Frederick Scott Archer, published in London, in 1852, and of "Plain Directions for Obtaining Photographic Pictures," &c. &c., by Gustave Le Gray, of Paris, published in London, in October, 1851.

In the former, page 22, we find all there is in the book concerning the use of bromide of potassium in collodion, which is as follows:

"A small quantity of bromide or fluoride of potassium or of arsenious acid may be added to the solution. However, they do not accelerate to any degree."

In the latter we find on page 37, as follows:

"I use the collodion as recommended to be prepared by Mr. Archer; to this I add one grain per ounce of arsenious acid; a very little bromide of potassium also seems to have a beneficial effect."

This latter clause is from a paper, signed "W. J.," and does not appear to have been written by Le Gray.

We make these extracts for what they are worth. Mr. Simpson went to some trouble to secure them for us, for which we

return many thanks. We understood that these were the earliest published evidence that bromide of potassium had been used in collodion, but a correspondent seems to have found another. Our readers will, no doubt, write to him by the gross, and doubtless he will be quite as willing to reply as we have been, only we hope those who write will not fail to inclose a postage stamp.

"THE BROMIDE QUESTION—BEWARE OF HUMBUG!

"Some enterprising party has employed a trick under the name of Cutting's patent to assess the photographers of the United States at large of amounts dictated by the agents of said patent. They succeeded by scaring photographers and whole photographic communities of being sued for infringing patent, said to be taken out in 1853 or 4 on a process, which no photographer is practizing and of which patent very few knew anything of. This easy way of making money out of photographers deserves a little light on the subject.

"What is the patent and what claim does the patentee hold? The patent was granted on a complete process of making a certain kind of ambrotypes and gives the details how to prepare the gun-cotton, the collodion, the silver bath, the developing, the fixing etc. for this process. But it is not for using *this* process (which nobody would like to use) that the patentee claims his rights, but is claimed by him for using *bromides in collodion*, although this was not the object in granting the patent. The formula of collodion given by the patent has $2\frac{1}{2}$ grains *bromide of potassium* per ounze of collodion and on that point are his claims. Even those photographers who never used the bromide of potassium, does the patentee make responsible for using the bromides of ammonium, cadmium, zink etc., which are just as much different in their substance from bromide of potassium as chloride of gold and chloride of sodium (the common table salt) are. It would be a hard nut to crack, to prove to any chemist that they were all the same.

"But even if they would, is Mr. Cutting the inventor of the use of *bromides in collodion* and as such entitled to a patent of them and was he the first who employed these salts for that purpose?

"His patent is taken out 1854. What about his invention, if we have books at hand, much previous to that date, which give all the details of the collodion formula claimed by him. For instance, Photographic Chemistry, by Wm. Barreswil & Davanne, Paris, 1851, gives complete formulas of collodion with *bromides of potassium*, *ammonium and cadmium*, with particular information. This is only one but a very good proof, others can be had if necessary to make the patent in this respect invalid.

"What remains of it? Who feels inclined to pay a hundred dollars to the pseudo-invention? He ought to be well satisfied with the result of his industrious speculation so far, but for the future it is hoped, it will be played out for ever.

"No matter what compromises have been made with Mr. Fredericks and the photographers of New York, Chicago etc. the patent should not scare anybody and the photographers who have plenty other troubles can feel very easy about this."

The above is just as we received it. We feared to attempt to correct it lest we might get it more in the wrong than it now is. It was signed "A St. Louis Photographer," and accompanied by the following letter written in the same hand. Inquirers will please address as below. The writer is not a subscriber to this Journal, which accounts for some of his remarks.

"St. Louis, July 7, 1866.

"Messrs. Benerman & Wilson,
Philadelphia.

"Sirs: Herewith receive a few lines on the bromide question, which, as interesting to every photographer, has become already a matter of dispute in your and other journals of photography.

"Perfectly convinced that the whole affair is but a humbug, and believing as you say that you have no part in it and like to do the best for your subscribers we trust that you will publish the article in *The Philadelphia Photographer*.

"It is our object to save our fellow-photographers from spending money for nothing, and we shall be glad if our endeavors have this result.

"Please send us a copy if published, care of W. M. Tilford, St. Louis.

"Very respectfully,

CRAMER & GROSS."

Now, dear readers, we hope to be relieved from wasting further space on this subject, for we do not believe it will do you any good. We have told you all we know about it. However, if any one else has any communications to make, send them on.

OUR PICTURE.

WE take pleasure in presenting with the current number a photographic gem from the studio of Mr. Wm. Notman, which is a fair specimen of his regular everyday portraiture. He has named it, for convenience, *The Two Sisters*. There is all the loveliness of girlhood pervading the picture, and it is altogether charming. That our readers may know how such work may be, is, and was produced, we requested Mr. Notman to send us the formulæ, which he has very kindly done, prefacing them by the following remarks:

"Accompanying this, I send you my formulæ for taking negatives and printing. I doubt not many of your readers will find nothing new; but success, I think, does not depend upon catching novelties, but rather on the careful application of well-proved processes, using the best materials, and studying, as far as opportunity occurs, the principles of art from books, paintings, engravings, and, above all, study from nature. Many photographers, I believe, pose and otherwise arrange their sitters with scarcely a thought of the final result, and when the finished print is attained do not look for what constitutes its beauties or defects, that they may in future secure the first, and avoid the latter.

"To secure the effect of atmosphere and space, with that delicate rounding of each part, it is necessary to have a full exposure, and in developing, care is required not to carry the intensifying too far. In my own practice the negatives produced may be called quick printers, with considerable half tone; but such negatives require great care both in printing and toning, particularly the latter, for if the toning is carried beyond a certain point, the prints are apt to have a flat, gray appearance; so in toning we seek a rich, warm tint.

NEGATIVES—FORMULA.

NITRATE BATH.

Water,	1 ounce.
Nitrate of silver,	40 grains.

Iodize with iodide of potassium, and slightly acidify with nitric acid.

DEVELOPER.

Water,	1 ounce.
Protosulphate of iron,	30 grains.
Acetic acid, No. 8,	1 drachm.
Alcohol,	1 "

INTENSIFY WITH

Pyrogallic acid,	1½ grains.
Citric acid,	1 "
Water,	1 ounce.

Adding to each dose, before putting on the plate, a few drops of

Nitrate of silver,	20 grains.
Water,	1 ounce.

Fix with a saturated solution of hypo. Varnish with shellac spirit varnish.

PRINTING SOLUTIONS—SENSITIZING BATH.

Water,	1 ounce.
Nitrate of silver,	30 grains.
Lunar caustic,	2 "
Alcohol,	1½ drachms.

Float two minutes; fume fifteen minutes.

TONING BATH.

Water,	210 ounces.
Acetate of soda,	1 ounce.
Bicarbonate of soda,	¾ "
Nitrate of uranium,	16 grains.
Chloride of gold,	12 "

Keep 24 hours before using. When about to use, add say 8 grains more of gold, and keep adding according to the quantity of prints.

FIXING.

12 minutes in hypo. 1 oz. to water 4½ oz.

As will be seen, Mr. Notman's processes are very similar to those well known to many of us. There is really not so much in the process as there is in working it. If a man is careful and cleanly, he will succeed in securing good results.

Disease is just as sure to follow slovenliness, and filth, and carelessness, in our business, as it is careless eating and unclean living in our lives. Be careful, be cleanly, be cautious. There is no reason why every one should not make just as good work as "The Two Sisters."

Salad for the Photographer.

Ventilate your dark-room well this hot weather. Open the door when you coat your plate, and step outside. Also, open it as soon after developing as you can. Acetic acid and ether are both injurious to the nervous system, and often produce death when inhaled to too great an extent.

An artist in Paris, a short time ago, made a photographic group of the principal members of the Theâtre Français, and enlarged and exquisitely colored it. On presenting it for admission into the exhibition of paintings, in Paris, it was refused! The picture was too true, for the jury could see in it only the precision of the camera. They praised the composition and the execution, but refused to admit it, as being too perfect.—*News.*

Paper Turning Yellow.—During the hot weather paper is more apt to turn yellow than when it is cooler. Use a plain silver solution, not too strong, and when perfectly dry, fume. Do not float the paper too long, and take care that your fuming-box shall be outside of the room you silver in.

To Clean the Fingers.—Put one-quarter pound glauber salts, one-quarter pound of chloride of lime (the sanitary disinfectant), and four ounces of water, into a small, wide-mouthed bottle, and when required for use pour some of the thick sediment into a saucer, and rub it well over the hands with pumice-stone or a nail-brush, and it will clean the fingers quite equal to cyanide, but without any danger. This will do to use over again until exhausted, and should be kept corked up.—*News.*

Photography Applied to Microscopic Researches.—A book having the above title has lately been published in Paris. Dr. A. Montessier, member of the Academy of Sciences at Montpellier, is the author. It contains very complete instructions, indeed, for obtaining photographs of microscopic subjects of all kinds. Dr. Montessier has been working in this most delightful branch of our art for a number of years, and by his perseverance and skill has done much in simplifying the instruments needed, and in rendering the processes easy. The book is profusely illustrated by wood-cuts and photographs, and is a valuable acquisition to the photographic library.

Substitute for Ground Glass.—Scraped white wax is dissolved in three ounces of ether to saturation; add sixty to seventy grains of finely-powdered gum-dammar, and a teaspoonful of plain collodion. Coat the focussing-glass with this mixture, as with collodion. With too little dammar, the film wears off; with too much, it becomes too transparent.—*Photo. Correspondenz.*

There is a party in Vienna whose chief work is to photograph dead bodies, subjects in the dissecting-room, interiors of tombs, sepulchres, and mausoleums. He was formerly a butcher.

The New Size.—In our last number, we extracted from a contemporary a suggestion, that a new size of photographs and albums be adopted. We have the following remarks from Mr. William Notman on the subject, which, we think, are nearer the right thing: "Respecting the larger size of cartes proposed or noticed in your July part, I think the size given a bad one, being too broad, and the card-mount too long. If they are going to be introduced, I would recommend some little care in deciding on the size, and would propose the following size of picture, 5 by $3\frac{1}{4}$; size of mount, $5\frac{3}{4}$ by $3\frac{1}{2}$. This size will be found to give much the same proportions as the usual carte; and, another advantage, the usual size one-half plate glass, would do for the negatives. The album opening would require to be $4\frac{3}{4}$ by 3."

A good-natured subscriber in Wisconsin says: "Somebody has got my June *Photographer*—hope some poor, benighted photographer has it. I think, after reading it carefully, he will conclude that the only sure way to success is via-*The Photographer.*" Another one, in Massachusetts, says, re-

specting our Journal: "The question which often comes to my mind is, 'how any photographer can be satisfied to shut himself up in his own dark-room' when so much 'light' can be obtained from so small an expenditure? I shall ever take great pleasure in recommending it whether I am in or out of the shadows."

Mr. Leighton Pine gives the following formula for a weak silvering solution, in Humphrey's Journal: "I take a number of sheets of albumen paper, and lay them in a pile, face upward. I brush over them, one a ta time, a solution of ninety-five per cent. alcohol, three parts; water, one part. Half an ounce of this solution is enough to cover a whole sheet of paper eighteen by twenty-two inches. The papers are hung up separately to dry. The albumen is thoroughly coagulated, and thus rendered insoluble in water, and the gloss of the paper is improved by the action of the alcohol. The silver bath is prepared as follows:

Nitrate of silver, . .	20 grains.
Water, ...	1 ounce.

Dissolve and set in the sunlight until it blackens and clears up (by this operation the impurities in the silver and water are precipitated), after which filter clear; then add a few drops of a saturated solution of citric acid. The first two or three drops of this solution will turn the silver milky, and cause a precipitate. Continue to add the acid, drop by drop, until the bath clears up, and the precipitate is redissolved; then filter again through a clean filter, and the bath is ready for use. The paper is floated from two to five minutes on this solution, according to the temperature of the room and thickness of the paper. A mottled appearance when printing indicates the removal of the paper too quickly from the bath. After silvering, the paper is dried and fumed the usual way. When silvering, shake the dish after removing each sheet, as by so doing the top of the silver solution is kept of a uniform strength."

The Pentagraph.—The Br. Jour. for May 25th, is accompanied by a very curious specimen of work in the direction of photo-lithography, called a pentagraph, an invention of Mr. Joseph Lewis, of Dublin. "A good general idea of the instrument used for taking them may be obtained from the following: A sheet of India-rubber of the thickness of card-board is fixed by the edges to a suitable frame so constructed as to cause, by turning a handle, the web of India-rubber to be expanded equally in every direction and to any extent. The four sides of the frame to which the elastic web is attached, recede from or approach each other by manipulating the adjusting screw in one corner. If, when the elastic sheet is expanded, an impression be printed upon its surface with transfer ink, it is obvious that when the sheet is allowed to contract to any given extent, and the print be then "set off" or transferred from the rubber to a new and polished stone, the resulting picture will be a perfect and reduced *fac simile* of the original."

This is a most wonderful invention. Any subject may not only be reduced or enlarged by it, but its shape may be changed. The specimen spoken of is a copy of the cover of the Br. Journal reduced 4, 8 and 12 times, and in one case the width changed. All are beautifully distinct. We hope for much from this process.

Stippling.—A correspondent of Humphrey's Journal uses the following plan for stippling opal pictures. After placing the negative and opal glass in the printing frame, he scatters upon the face of the negative some finely pulverized chalk, and immediately blows it off again; but a sufficient quantity of the finest particles adhere to the surface of the glass, and, being in some degree opaque, they impede the passage of light, and thus produce a granulation in the print beneath. The editor says "the result is curious, and not unpleasing. The pictures very much resemble the copy of an engraving."

Shellac Solvent.—Those who make shellac varnish will be glad to thank the Scientific American for the following solvent for gum shellac. In one gallon of rain water, heat $1\frac{1}{2}$ lbs. of the gum until it becomes soft and stringy, then add 1 lb. saleratus, which will cut the gum and render the compound clear.

Editor's Table.

New Galleries.—Pull down and build greater seems to be the rule with successful photographers.

Several of our subscribers have recently put up new galleries, handsomely furnished. Mr. Chas. A. Saylor, of Reading, Pa., has just completed and occupied his new rooms, which are by far the most elegant in that city. His walls are covered with fine specimens of his own work, and everything is in good style and prospering.

Mr. C. E. Edwards, of Bridgeton, N. J., has also erected the handsomest rooms in that region, and Mr. J. B. Brown, of Millville, has followed his example, proving that photography is amply patronized by the good people of New Jersey.

Mr. John F. Nice, of Williamsport, Pa., has handsomely refitted rooms in that live city, which rival many of our Philadelphia establishments. All of these gentlemen believe in making a good display of specimens, and it pays well.

We shall be glad to hear of the prosperity of any of our other subscribers, and to notice it. These few we have the pleasure of being acquainted with. Let us hear from you. The *Journal is yours, and for your good.*

"Can't Keep House Without It."—Another correspondent writes: "Please find money inclosed to continue our Journal. My wife thinks as much of it as I do, and we can't keep house without it." That man and wife are sure to prosper.

In the last number of Humphrey's Journal, our contemporary says, we copied "*verbatim*" one of his articles from, and credited it to, the Photo. Archiv. This is not so, and we should be sorry if it was "*verbatim*." The process in question, which is a well-known one in France, was on "Enlargements," and appeared in Mr. Lea's summary for last month. Our contemporary recommends in the salting solution the use of "*flouride* of ammonia, 1 grain;" we copy it from the Archiv, *fluoride* of ammonia, 1 grain. May we ask our contemporary what "flouride of ammonia is?"

He also, in his version of the formula, recommends the use of "iodide of potass," "cyanide of potass," and "liquor ammonia." Will he please explain what these articles are? Probably he means iodide and cyanide of potassium, and liquor ammoniæ, or liquid ammonia.

And may we also ask him how it is that in one of his recent advertisements he announces that Mr. Lea is a regular contributor to his Journal, when Mr. Lea writes only for this Journal in this country? *How is this, brother?* We certainly *desire* to be frank and liberal, and make it a special point to give credit whenever we copy, but in the case mentioned we were not intentionally guilty, if guilty at all.

Prof. Charles F. Himes, who was called about a year ago from one of the German Universities to fill the chair of Natural Science at Dickinson College, Carlisle, Pa., had the honorary degree of *Doctor of Philosophy* conferred upon him at the commencement of the Indiana Asbury University. Prof. Himes is one of our young men who are sitting in the high places of literature. He is an adept in photographic manipulations, and we trust it will not be long before our readers shall be treated to some of the products of his gifted pen.

The same degree (Ph. D.) was conferred upon Prof. Henry Morton, at the commencement of Dickinson College, held June 29th, 1866, a fact which we also rejoice to announce.

We have received a very polite and fraternal letter from our friend, Signor Ottavio Garatti, editor of *La Camera Oscura*, Milan, Italy. We have sent him No. 23 of our Journal as he desired, and thank him for his good words. His Journal is characterized for its independence and avoidance of writing for mere speculation, and for the absence of that jealous feeling that pervades so unpleasantly elsewhere. On page 118 of this volume of our Journal we extracted from the *Camera*, Signor Cocco's article on "Printing and Toning." In the twelfth line of that article substitute the word *nitric* for "*citric*."

We have received from Mr. William Notman, Montreal, a very pretty little pamphlet, showing forth the merits of his saloons, illustrated by a photograph of his building. It also contains many "things you ought to know," among which is the following: "Avoid, if possible, being in a hurry when you go to have your portrait taken."

Our Berlin Picture seems to have given general satisfaction. One says, "It is as good a picture as anybody need ever wish to make;" another, that "it is worth the price of a year's subscription."

We have received from Mr. J. Landy, Cincinnati, Ohio, a very fine picture of a terrier dog. It is one of the best we have ever seen.

Microscopic Photography.—We have received from Mr. Moses, of New Orleans, his process for making microscopic proofs for charms, pencil and knife handles, &c. It was sent to us under promise of secrecy, but Mr. Moses is willing to sell his process to two hundred people for twenty-five dollars each. He would also undertake to supply cameras lenses, stanhopes, &c., for the manufacture of these pretty little curiosities. He may be addressed, Care Lock-box 177, New Orleans, La.

Should our readers not receive as prompt a response to their letters as usual, during the coming month, they will please excuse us, as we shall be obliged to go out of town for a short season of recreation.

A Leading Stockdealer in New York sends us the following:

"We sent a sample copy of your Journal to a customer in the West. His reply was, viz.: 'The Journal came duly to hand; it was the best mental feast I have had in a number of years.'"

Mr. Sellers's Lecture.—We regret that we are compelled to lay over the continuation of Mr. Sellers's excellent lectures until our next, when we shall commence the publication of his third lecture.

Messrs. H. C. Price & Co.—We would call the attention of our readers to the new advertisement of Messrs. H. C. Price & Co., stockdealers, 600 Broadway, New York, successors to O. S. Follett and C. D. Burwell.

Mr. Price was formerly with Mr. Follett, and is well known and popular in the trade. If we are to judge of the promptness of this young house in their future transactions with their customers from their promptness with us in our only transaction with them, there will be no delay in getting off goods in time, or danger of anything being neglected.

We have appointed them our authorized agents to receive subscriptions and advertisements for our Journal, and hope they will receive a bountiful share of the business attendant upon the wonderful art of photography. Call and see them when you go to New York.

The Stamp Nuisance.—Just as we were about to go to press, we received a telegram from Hon. E. A. Rollins, Commissioner U. S. Inter. Rev., Washington, D. C., stating that "photographs must be stamped until August 1st." After that we are free from the stamp nuisance, and pay five per cent. tax on sales of plain photographs. More particulars in our next.

To Inquiring Minds.—We very frequently receive letters from our subscribers complaining that in answer to advertisements in this and other journals, they send money to certain advertisers for goods advertised by them, and neither get the goods nor any response, even after writing repeatedly about them. We have also had handed to us several copies of price-lists announcing goods for sale at prices too low to fill orders in honest quality and quantity. Now, we can indorse the character of all of our advertisers, we think, though not of all the goods they offer for sale; but we are all liable to disappointments, and it may be, that sometimes a dealer thinking he has a good article, in his hurry to get it into market announces it too soon or rather before completing his experiments. This causes delay, and as an advertisement in *The Philadelphia Photographer* generally sends the advertiser a host of inquiries, it may be that he gets too many letters to answer in any other way than by sending the goods. If they do not come shortly, then the complainant should insist on a response.

With respect to the second matter, *we would caution our subscribers against all dealers who habitually offer by printed priced circulars, goods at "extremely low prices," and "subject to market changes."*

We have one before us now offering alcohol at \$4.25 per gall., acetic acid at 45 cents per lb., ether at \$1.45 per lb., silver at \$1.12 per oz., iodides and bromides at forty cents and fifty cents per oz., and mats and preserves, cases, &c. &c., at prices to suit—of course, "subject to market fluctuations."

Having daily opportunity of judging, we may assert that good, reliable goods cannot be bought at wholesale at any such prices, and our subscribers should have nothing to do with those who offer them. The "subject to market fluctuations" is printed in very small letters, and is intended to cover any additions that may be made at will to the prices named in the list. We say, beware of such. Select from our advertising list some one stock-house. Send them your orders, and trust them, and depend upon it you will do better in the long run than by biting at every cheap price-list you get from those you know nothing about. You are sure to get caught in the end.

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SOME REMARKS ON FOGGING.

BY M. CAREY LEA.

To any one accustomed to watch the action of developers, fogging subdivides itself into appearances, differing very much in character, so much so as at once to suggest that they arise from very different causes. And not only is there wide variation in the appearances upon the plate, but also in the accompanying phenomena, especially in the behavior of the developer itself.

We will sometimes see the plate fog, whilst the developer remains perfectly clear and transparent; sometimes the developer will turn so thick and muddy as to seem as if it might lead to any amount of fogging, and yet the plate will remain obstinately clean. Generally speaking, the presence of much acid makes a slow development, and tends to give immunity from fogging, but this is not always the case.

The fogging of an iron developer is also very different from that of a pyrogallic. A pyrogallic developer scarcely ever fogs unless much mismanaged, but when it does, casts a brown veil over everything. It never or rarely fogs in spots, whereas an iron developer, when it fogs, is very apt to do so—not, however, to the exclusion, under favorable circumstances, of a general fogging like that of pyrogallic acid.

But there is even, in this case, a broad distinction to be drawn. Fogging with pyro, generally arises, when it does come, from an attempt to bring up by a long redevelopment an image which has come up very thin under an iron development, in consequence of excessive underexposure. This necessity for so much redevelopment can scarcely happen, except in the hands of one but little versed in photography, and such cases of underexposure are not properly treated by a long pyrogallic development, which renders them hard and blocky, and besides, they are extremely apt to split in drying. The best treatment and the least trouble in such cases of serious underexposure, is to wash off the picture, and begin over again. When this is not practicable, the image should be subjected to such intensifying as tends to bring up its respective parts proportionately (Schlippe's salt is the best means that I know), the deposit from a pyrogallic development always falls chiefly on the densest portions.

It follows, therefore, that pyrogallic acid, when used in those cases to which it is properly adapted, viz., to the moderate bringing up of a well-managed iron picture, scarcely ever fogs—one may say, in practised hands, never. Its use should never extend to a point at which fogging is possible.

With iron, the case is very different; the causes of fogging are very numerous, and may occur occasionally with the best manip-

ulators. I will rapidly enumerate some of the more familiar forms, and then pass to the consideration of one particular description which has much puzzled photographers.

First. The image shows itself for a moment, and then a uniform gray veil spreads over the picture, more or less thick. Here the developer and the bath are not adapted to each other—the bath wants more acid.

Second. The picture comes out well, but curious streaky stains invade the sky in a landscape, or the top of any other subject. Cause, insufficient draining of the plate, insufficient time in the bath, or too horny a collodion.

Third. Streaks like flashes of lightning, sometimes, with a dozen zigzags to an inch, establish themselves here and there, reaching in from some edge, several inches into the plate. These I have had come from applying blotting-paper on the back, too wide, so that it reached an edge, and set up a capillary action with the film.

Fourth. The picture develops well up to a certain point, and then gradually veils itself, a thin gray coating covering up the transparent portions, and destroying all hope of a really good picture. Cause, either insufficiency of acid in the developer, or else, pushing the action further than an ordinary iron development will bear.

(Cases of this kind, where a slight fogging has set in before the image has acquired the necessary strength, may be subjected with advantage to a treatment of bichloride of mercury followed by cyanide of potassium, in the manner which I have elsewhere described.)

Fifth. There is a very interesting species of fogging, differing altogether from any of the foregoing, the origin of which has been the subject of considerable speculation and discussion. This sort is not general, but local; irregular figures are formed, somewhat resembling the figures in marbled paper, but which have been exceedingly well figured in an editorial article in the British Journal some time last summer. One particular characteristic of this sort of fogging which, I do not think, has been before pointed out, is that these marks are always more metallic in appearance than the rest of the surface.

In the editorial article which I have just referred to, these marks are ascribed to peculiar conditions of the collodion film. They are said to occur most often in plates that have waited for some time between sensitizing and development, and it is remarked that on such plates, if closely examined before development, marks somewhat similar to the stains here spoken of, will be found, and are supposed to be attributable to partial and unequal drying away of the bath solution.

I have already expressed my opinion in print that, while this cause may occasionally operate, and may have something to do with the formation of stains (the article just referred to states that plates on which the marks that are there described have shown themselves, will afford stains by development even without exposure—an important fact which I shall advert to again presently), yet stains having the characteristic appearance which are there so correctly figured, will make their appearance on plates with which the sensitizing, exposure, and development have followed in rapid succession.

Professor Towler some time since published an editorial on the same subject, interesting, and bearing the marks of close observation. His explanation differs from mine in this only: he has given the proximate, and I the ultimate cause, as I believe, of this annoyance.

I attribute the production of this sort of stains to the use of a developer stronger than the actual condition of the particular plate would bear. I was led to this conclusion by the following observations:

I made a number of experiments some time since with a developer, differently constituted from any that has ever been suggested. My developer contained a large quantity of *acetate of copper*, and I tried it for the following reasons:

It is a well-known fact that protoacetate of iron is a powerful reducer and developer. The only convenient way of forming it hitherto employed has been to add acetate of lead to sulphate of iron, and remove the sulphate of lead which precipitates, by filtration. This developer has never come extensively into use, but has been favorably commented upon, and I observe that M. M.

A. Gaudin has lately been experimenting with it, and calling attention to it.*

Also, it has been stated apparently on good authority, that sulphate of copper in the developer exercises a favorable action on the density of the image.

It occurred to me, therefore, that I might combine these advantages, by using at once protosulphate of iron and acetate of copper.

The first question which arises is, what takes place when these substances are mixed in solution. We have the strongest acid combined with the strongest base already, in the sulphate of iron. The conditions, therefore, for double decomposition, are not favorable, seeing that there is not, as in the case of the lead salt, an insoluble substance to be precipitated and removed from the solution.

Of late years the opinion has prevailed amongst chemists that when two salts are mixed in solution, there is formed all the possible combinations of acids and bases which the constituents permit, and that these, supposing them all to be soluble, all coexist in the solution.

Now, in the present case, all the possible compounds are soluble. It is, therefore, probable that such a solution as I mention would contain, sulphate of iron and acetate of iron, sulphate of copper and acetate of copper.

Its action I found to be such as would be anticipated from the foregoing explanation of its constitution. It developed very powerfully, flashed out the pictures with much softness and detail, but fogged them, I might almost say, invariably, although free acetic acid was added. I am not at all sure, indeed, but what this developer might be advantageously used, in a diluter form (I used it very strong) than I employed. But at that time my experiments with the gelatine developer had acquired so much interest to me that I stopped my trials with this one, and now only advert to it, because it elucidates the point in question.

For the fogging produced by this developer was invariably of the kind now under consideration. I would get a perfectly clean plate in every other part, but ruined by a fog-mark—generally only one—of some extraordinary arabesque pattern. This I ascribed to the excessive strength and energy of the developer, and have since always attributed that sort of fogging to that cause.

Prof. Towler is of the opinion that this sort of stain is not formed upon the plate, but in the developer—that they are brought into contact with the film by the oscillating motion given to the plate to insure equal action, and then adhere to it.

Some observations which I have quite lately made, confirm the opinion I have all along entertained since reading his paper, that he is right.

I recently took some strong developer, and added to it a portion of bath solution, placing both in a small, clean, porcelain basin, so as to watch the operation of fogging by clear daylight.

I then saw distinctly that with certain kinds of developer, there would form after a lapse of twenty, fifty, or sometimes of sixty or eighty seconds, on the surface of the liquid, floating figures of a description exactly similar to the appearances produced by this sort of fogging upon the plate. They consisted of groupings of particles of metallic silver, changing their shape and figure at every instant, but always having a resemblance to the figuring of marbled paper, which is made as every one knows, precisely in a similar way, by the distribution of colored films on the surface of water, from which they are transferred to the surface of the paper.

Just in the same way, these curious silver figures are presently transferred to the surface of the plate, to the inexpressible annoyance and discomfiture of the operator. Why films thus loosely deposited should adhere with such tenacity to the collodion, it is difficult to say. Perhaps they are presently soldered fast by the advancing deposit of silver.

Almost all developers, when examined in this way, by daylight in a capsule, showed a tendency to this form of fogging, if their action was continued long enough. Developers which quickly become muddy, show these figures simultaneously with the muddiness, but they were smaller and less

* I should, therefore, perhaps remark that the experiment here described was made in the winter of 1864–5.

marked. Strong and well-balanced developers did not show them nearly so soon, but they were larger and most conspicuous, and *would present themselves, when there was not the slightest turbidity in the liquid.* This was very curious; it seemed like a sort of reversed development—a development upwards instead of downward.

Any one who is inclined to doubt that the explanation here given is the true one, may advantageously repeat the experiment in the manner which I have above described, when I think he will find that the exact resemblance of the figures which gather on the surface of the liquid, to those which he may have seen upon his negatives, will carry a conviction to his mind that they are one and the same thing.

After detecting the source of any trouble, the next thing is to seek for a remedy. A *tour de force*—in plain English, a "dodge" has occurred to me, by which this trouble might be avoided; but as I have had no trouble of this sort for a long time, I have had as yet no opportunity of trying it. I shall, therefore, not speak too confidently or positively about it, further than it seems to meet the requirements of the case.

These spots first form and show themselves on the surface of the liquid, on which they float freely. When the plate is tilted in order to pour off the developer, they do not follow the liquid; but the latter slips out from between, and deposits them delicately on the film. It would seem, then, that if the plate were carefully watched, keeping the eye on the surface of the film as well as on the developing image, and the moment a tendency to the formation of these figures was detected, the operator, instead of pouring off the developer, was to quickly set the plate (always holding it quite level), under a good stream of water issuing from a rose, these figures *could not get down* to the film. It is not their nature to sink through; they seem to adhere to the surface, and only reach the film by being left behind by the retiring wave of water, and then the whole stratum of developer is suddenly washed away by a stream of water which floods the whole surface; the floating figures must be carried away without an opportunity of fastening themselves to the film.

THE TRUE PRINCIPLES OF PHOTOGRAPHIC REDUCTION.

[In the inclosed letter, published with the consent of the author, Mr. Mathiot, who has charge of the Photographic Department of the U. S. Coast Survey at Washington, the application of measuring from the true focal centre, instead of the optical centre, for all purposes of exact reduction or reproduction, is fully developed, and the experience of Mr. Mathiot will have a real value for all engaged in similar work. It should be said here that the first exact exposition of the difference between the optical centre and the focal centres (vertices of the cones of admitted and emitted rays) appears to be due to M. Secretan, of Paris (*De la Distance Focale des Systèmes Optiques Convergents*, Secretan, Paris); a work which, I believe, has never been translated into English, though fully deserving it.

The difference which Mr. Mathiot finds between the calculated and the measured absolute focus, probably arises from the fact that in the formula which he uses $\left(\frac{1}{f}=\frac{1}{v}+\frac{1}{u}\right)$, the thickness of the lens is not taken into consideration.]

WASHINGTON, June 8, 1866.

M. CAREY LEA ESQ., Phila.

DEAR SIR: In the number of *The Philadelphia Photographer* for the present month, you present a very important paper on the necessity of measuring the foci of lenses from the focal centres, instead of the optical centre, as almost invariably directed by writers on lenses. I have been greatly interested in your article, and would like to make you acquainted with my experience in working with foci thus determined, not thinking that I can add anything to your demonstration of the correctness of thus measuring the foci, but merely supposing that an account of working with that method would be gratifying to you, as an experimental proof of the truth of your demonstration.

In the U. S. Coast Survey Office, photography is used to reduce the field sheets to the publication scales. These photo-reductions have exceedingly fine lines, being generally reduced eight times in size, and have to be exact in size to one decimillimetre

(0.0039 inch). You will, therefore, readily perceive the necessity of having the exact focus, or greatest "sharpness" on the plate, along with the position which gives the exact size, and also the difficulty of finding these two concurring points by focussing on the ground glass. I almost wore my eyes out by focussing by inspection, and was driven to seek for a formula for finding the focal distances by calculation, and tried everything given in the works on optics without success, until it occurred to me to make the measurements from the focal centres, instead of the optical centres. Since then, we have had no difficulty in making a reduced copy of a map, to any required degree of exactitude, and instead of the numerous trials for finding the required size, a short calculation alone has to be made. No ground glass is used; in fact, there is no such thing about the camera, it having got broken to fragments some years ago, and having before fallen into disuse.

We use a 16-inch Globe here for making our reductions, and I find the difference in the equivalent foci, as indicated by measuring from the focal centre and from the optical centre, to be very considerable. When the camera is placed so as to make a copy of the exact size of the drawing, the distance from the drawing to the plate (or place of the ground glass) is 1.977 metres (6 ft. 5.83 in.), consequently the equivalent focus by the optical centre is 0.494 metres (19.44 inches). And to make a copy one-eighth the size of the drawing, the camera has to be moved 3.458 metres (11 ft. 4.14 in.) further off, supposing this determination of the focus to be correct. But experience shows this position is far from the size and focus too, and that the true position is 3.532 metres (2.91 inches more). And as the unquestionable law of the relation of the conjugate foci $\left(\frac{1}{v}= \frac{1}{f}-\frac{1}{u}\right)$ requires that the real focal length is one-seventh of the increased distance between the position which gives the size $\frac{1}{1}$ and $\frac{1}{8}$, therefore the true focal length is 0.5046 metre (0.417 in. more).

I measured the focal length by the following method, which also proved that the determination from the optical centre was wrong. The camera was set on a distant landscape, with the smallest aperture open, and one hundred thin pictures on glass were made each at different distances from the lens. These were compared for sharpness by inspection under a microscope, and measured in size by the micrometer. The result was, that the successive pictures in size were formed in a cone which had the apex at 0.5032 metre (19.81 in.) distant from the best defined picture.

But the latter determination (0.5032 metre) differs from the former (0.5046 metre). They are both correct, however. The latter for the image side of the lens, and the former for the object side. *Practically*, at least, I find the two foci are not the same. The shortening on the image side *may* (?) be caused by the spherical aberration of the lens; for, with the largest aperture, I find the focus on the image side only *about* 0.5007 metre, and it may be, that theoretically the *very central* rays have the same focal length on each side; but the descrimination is indispensable for a nice use of the lens.

I fix the focal lengths and focal centres by the following method: First, set the camera on a very remote object, and get the best possible definition. Then mark the place of the shield by a scratch across the edges of the base board and side of the shield, or the back of the camera, which carries the shield. Now set the camera to make a copy of a drawing of its exact size and best possible definition. It now follows that the distance the shield has been moved out from the lens, as indicated by the notches made on the shield and base board, is the focal length for the image side. Twice this distance laid off from the plate (or place of the ground glass) to the side of the mounting of the lens gives the plane of the focal centre for the image side of the lens, and this should be marked by a line on the mounting. Next mark the new position of the mark on the shield, on the base-board, divide the distance between the two marks on the base-board in the middle, and bring back the shield-carrier till the notch on the shield cuts this middle mark; the shield is now in position for making a photograph of exactly *half* the size of the drawing. Now mark the distance of the camera from the drawing on a rod, by making a mark across the rod and some part of the camera, and

move the camera off from the drawing till the image is exactly one half its size. Measure the distance the camera has been moved out as indicated by the mark made across the rod, and on the camera. This distance is the focal length of the lens for the object side of the lens, or combination of lenses. Three times this latter distance laid off from the drawing to the mounting of the lens marks the plane of the focal centre for the object side of the lens. And a mark made here is the true place from which all measurements should be made for setting the camera. These determinations should be verified by taking other distances from the drawing for reductions to one-fourth or one-tenth, if practicable, *and each aperture must have its own determinations.*

I intended giving you somewhat of the practical operation of setting the camera for a proposed reduction, but must close this already too long letter.

Fraternally,
GEO. MATHIOT.

REMARKS UPON

The Action of Cyanide of Potassium on Photographic Impressions.

BY M. CAREY LEA.

IN a paper recently published, I gave the results of an examination upon the existence of silver in the whites of albumen prints. I propose to add thereto some observations upon the influence of cyanide.

If a paper positive, printed and toned in the usual way, be plunged into a dilute solution of cyanide of potassium, and be hereafter washed and dried, sulphydrate of ammonia applied in a thin streak upon the whites with the aid of a clean new quill pen, exhibits the remarkable fact that the silver has been wholly removed.

It is greatly to be regretted that the picture is at the same time materially weakened. It is true that, by overprinting, a positive print may be made able to bear the action of a weak solution of cyanide without serious injury, and that method has been recommended as a means of bringing down the strength of prints which have been accidentally overprinted; but still it would scarcely be allowable to use so powerful an agent habitually.

There is something well worthy of attention in the action of cyanide of potassium. When used upon a negative, it clears it away, reducing its strength a little, but affecting the delicacy of detail so little, that some first-rate photographers have been willing to employ it habitually. But when used on paper prints, the effect is very powerful, and with strong solution a print may easily be entirely effaced.

The reason of this is not altogether easy to explain. The negative consists chiefly of metallic silver. The print contains metallic silver, metallic gold, and an organic compound of silver. All of these three substances are soluble in aqueous solution of cyanide of potassium; if metallic gold only were soluble, and metallic silver insoluble, it would furnish a ready explanation, but this is not the case. We are thus led to conclude that the peculiar weakness of paper prints in respect to resistance to the action of cyanide, depends upon the organic compound to which they owe much of their strength.

Another reason for the non-resistance of paper prints probably lies in the greater division of the metallic particles of which they are composed. All substances, when finely divided, are more easily brought into solution, and a proof of that fact in the present case may be found in an observation made by Prof. Dawson, that when organic developers are used, negatives are more weakened by fixing with cyanide. Girard has shown that, in the case of organic development, the silver is precipitated in much finer particles than when an iron developer, pure and simple, is applied.

The fact that silver may be removed from the whites of albumen prints by cyanide of potassium cannot be without interest to photography. It may be found that albumen prints on opal glass are susceptible of being fixed by cyanide of potassium, and if so, they would undoubtedly give a promise of greater permanence than when fixed by hyposulphite. Still, unless experience should show a very decided and well-marked superiority, resulting from the application of cyanide, its use must be condemned on hygienic grounds.

NEW APPLICATIONS AND IMPROVEMENTS.

THE following are the specifications of Messrs. Southwell Brothers' process for

TINTING PHOTOGRAPHS BY LITHOGRAPHY.

"Having procured a good negative photograph in the usual manner, we carefully block out the background with opaque color or paper, in such a manner that the background shall not print, but remain on the printed photograph white. After having procured a print off the negatives with a white background, after the manner described, we fix, tone, and wash in the usual way, with careful printing, and thus obtain a photograph ready for the following tinting, embossing, and coloring: First, lay the photograph upon a flat board, and upon that a piece of tracing-paper large enough to cover the photograph; then, with a lead-pencil, trace carefully the outline of the photograph, which done, remove the tracing-paper, and cut out the outline of the photograph which we wish to preserve from the tint about to be applied; fix this upon the photograph by a little gum, carefully registering the outline of the photograph, for where this tracing-paper does not cover there will be the tinting, which was intended only for the background, and not for the portrait or landscape photograph. This being done, the tint of the desired color is rolled on the lithographic stone, and printed all over the photograph in the usual way of lithographic printing; the tracing-paper which was fixed to the photograph, having prevented the ink from touching the print, may now be removed with a damp sponge. We shall then have a photograph with an evenly tinted background, and should we desire to give the print a tint all over of any lighter color, we print again with the lithographic press all over the picture unprotected by the tracing-paper, which, in some instances, improves the general tone of the photograph. Second, the photograph may now be embossed to give it the appearance and advantages of drawing-paper, which is performed thus: Damp the photograph between some sheets of wet blotting-paper, then lay it upon a block cut, engraved or engine-turned, of any design you may please; but the simplest way is to lay it upon a fabric of silk or alpaca twill, or other fabric that has the resemblance of wire mark, such as the drawing-papers usually show impressions of; then put the paper and block or fabric, the impression of which you wish to give the photograph, under a lever or other press, with several thickness of blotting-paper next the photograph, between it and the press. Submit it then to a severe pressure, and the photograph will have the impression of the fabric or block used, and should then have very much the appearance of a photograph taken upon drawing-paper, with a fine even background tinted. Third, the photograph may now be mounted on cardboard, and is then all that the artist employed to color it can wish. The tinted background gives relief to the photograph, and the embossed paper is a desideratum which cannot be too fully appreciated by the artist. If skilfully colored with water colors, the photograph has the appearance of a superior colored drawing."

ORNAMENTING JAPANNED SURFACES WITH PHOTOGRAPHS.

BY T. FARMER AND F. LEWIS.

The following is a method of transferring collodion positives to japanned surfaces for decorative purposes. The specification is as follows:

Our invention consists in ornamenting the surfaces of japanned goods, and papier mâché goods, and other varnished surfaces, by applying thereto positive photographic pictures in the manner hereinafter explained.

The essence of our invention consists in removing the film on which the photographic picture is produced from the glass or other surface, and applying it to, and fixing it upon, the said japanned or other surfaces.

We will describe our invention with reference to the ornamenting of the surfaces of japanned goods by means of collodion photographic pictures produced on glass. We take a positive collodion picture, which has been produced in the ordinary way; we prepare a piece of paper, or other suitable flexible material, by coating it with gelatine; we lay the gelatine surface of the paper upon the collodion picture on the

glass; and when it has remained thereon until the gelatine is nearly dry, we remove it, the said gelatine surface bringing with it the positive photographic picture which had been produced on the glass. The photographic picture thus obtained, adhering to the gelatine surface of the paper, is now ready to be transferred to the surface to be ornamented. In order to prepare the japanned surface to receive the said photographic picture, we apply to the said surface a spirit or other varnish. Having varnished the surface, we place the photographic picture attached to the surface of the gelatine upon the prepared surface to be ornamented, and by gently rubbing or pressing the gelatine-paper, we make the photographic picture thereon adhere closely to the prepared surface. The gelatine and paper are then removed by means of warm water, leaving the photographic picture on the said japanned surface, the photographic picture being uninjured by the treatment to which it has been subjected. The photographic picture is afterwards secured and protected, and painted if required, and varnished and finished as in ordinary japanned goods.

We wish it to be understood, that in practising our invention, we employ photographic pictures of the kind called positive pictures, whether the said pictures are positive by reflected or transmitted light. When we employ positive photographs, which are positive by reflected light, we make the ground or surface black, or of a dark color, to which the picture is to be transferred. When we employ photographs which are positive by transmitted light, we make the ground or surface white, or of a light color, to which the picture is to be transferred We have not thought it necessary to describe either the methods by which the positive photographic pictures which we employ are produced, or the processes of preparing the solution of gelatine, or the varnishes which we employ, as the said methods and processes are well known, and, separately, commonly practised, and constitute no part of our invention.

In ornamenting surfaces according to our invention, we use all kinds of positive photographic pictures, such as portraits, groups, statuettes, landscapes, and ornamental designs in general, the said pictures being applied in the manner hereinbefore mentioned.

Having now described the nature of our invention, and the manner in which the same is to be performed, we wish it to be understood that we do not limit ourselves to the precise details herein described, as the same may be varied without departing from the nature of our invention; but we claim, as our invention, ornamenting the surfaces of japanned goods, and papier mâché goods, and other varnished surfaces, by applying thereto positive photographic pictures, substantially in the manner hereinbefore described.—*Photo. News.*

THE TALE OF TWO GIANTS.

A LONG while ago the sleepy world was awakened by a loud blast from a trumpet. Such a sound they had never heard before, and when they found that it came from a huge giant who had made his appearance in the midst of the people, they trembled and were much afraid. The name of this giant was *Delusion*, and ever since, to this very day, he has been blowing his trumpet and performing great works, causing sorrow and joy, pleasure and pain, admiration and ridicule. He made conquests wherever he went, and, strange to say, carried neither sword or spear. A great number of brushes and pencils, and sundry beautiful colors, with a girdle of canvas and helmet of wood, were his only weapons, and with these, then, and ever since, he has conquered his foes, and made them bow before him and admire his handiwork. By his mighty power, he could delude the most skilful and sceptical. With his great arms he would fasten up a huge piece of canvas before the eyes of the people, setting himself to work for awhile, would mix his mysterious colors, and then call the people around to look at him. "See!" he would say, "Do you see yonder mountain-top, with the winding silver stream leaping down its rocky sides, the chamois springing from crag to crag, the speckled trout playing in the quiet pool at the foot of the fall, the school-boy fishing patiently under the bridge, the old miller leaning over the hand-rail, and the peasant mother resting with her little ones under the shade of

the trees? By twirling my pencil in these colors I am able to spread all these beauties upon my canvas as you now see." And with these bombastic words, and a few additional touches of paint upon the canvas, the Giant Delusion conquered the people. It was curious to watch the effect of his doings upon them. He not only caught the beauties of nature and fastened them to his canvas, but those who came to see him were pretty well represented also by his wonderful hands. True, a shapeless daub here stood for a tree, and a fuzzy speck there made a goat, or may be a waterfall, just as it seemed to be required. A streak of black made hair, a white spot the face, a black spot the eye, and a red one the nose, and it was strange to see how he deluded people into believing that his productions looked like them. He was a sharp young fellow, and no mistake. The sweet young girl was tickled to see what beautiful curls he gave her, though she blushed to think that she never had them of her own. The gouty old King who had previously been chief ruler, was also willing to praise when the Giant artfully removed his wrinkles and pimples and gave him nice fair skin and assured him it was like him. Beautiful children, villains, quacks, impostors, the bald-headed, the homely, and the fair, were alike deluded, and none ran away, while poor Truth sat chained and speechless upon her tottering throne.

Thus the Giant Delusion reigned for ages. An occasional effort was made by some agent of Truth, such as the engraver on wood, steel or copper, to divide the power; but so great was the hold that the other possessed that these had to follow in his footsteps and copy after him or forsake their vocation. It is so to this very day.

The Giant yearly grew more popular, and his fame became world-wide. Hundreds flocked to his assistance and became his subordinates. Great buildings were erected to his service, and admirers grew in numbers. He did an immense business, and all his subordinates became very wealthy. The palace and the castle walls were adorned with his delusive daubs, and he joined hands with Imagination, to whom he paid a large income to assist him. True, his colorings were beautiful, but were they truthful? Nay?

Some of the most courageous became dissatisfied, and dared to express themselves so. They would enter the palaces, make telescopes of their hands and look at the old, black, seam-cracked paintings, and declare them to be untruthful. The outlandish obeisance paid to Delusion must be stopped. Truth must be released from her imprisonment, and have a giant to fight for her! Who will do it? "I!" says a presumptuous Frenchman. "I will undertake to create the new giant, but it will be years before he can attain either very great strength, success, or much encouragement from the people, but he shall have all in due season."

"With what shall he defend himself," cried the people? "His weapons shall be certain mysterious chemicals, whose nature you must not know, a queer-looking little arrangement with a glass eye, and he shall have power to call the King of the day to his assistance whenever he desires it." "Have faith, and encourage him," cried the Frenchman, "and watch his growth."

And thus *Fidelity*, the giant opponent of Delusion, was created. Having placed his one-eyed box in position, by the motion of a black cloth, everything would creep into it, and be handed out to the people on a copper plate all polished and silvery. Trees, houses, animals and people were all thus handed out to the astonished multitude without change of form or feature. He would even put his hands down into the bowels of the earth and bring up such wonders as few people imagined were there. And daily this youthful giant grew. Delusion would attack him wherever he could, and daub his work with ugly paint, and Fidelity would retaliate by splattering over the other's pictures a certain mysterious chemic he had that was clear as water in the bottle, but when thrown upon the paintings turned black as night.

Persecutions, threats, promises and compromises were all offered to the young giant by the other, but without hindering his growth or curtailing his usefulness. Venturesome persons were presumptuous enough to become his knights and learn his black art and practise it. Before many years he made pictures upon glass, iron, wood, paper, and oh! horrors, upon canvas! Great studios

and beautiful stores were erected to the service of Fidelity, and old Delusion began to tremble. Finding his enemy becoming too powerful, he tried every way to destroy him. Some of his agents started journals, and wrote all sorts of things about Fidelity—called him sham, humbug, short-lived, untruthful, deformed, distorted, and all sorts of evil names, until he had to start journals also to help fight his battles. Fierce struggles ensued, always ending in making Fidelity more popular, and adding thousands to his list of friends. So great was the demand for his work that great factories and laboratories had to be erected to keep him in materials.

Some of the wiser friends of Delusion endeavored to persuade him that his rival could be made of great assistance to him, but he scouted the idea. They tried to induce him to make friends, but he had held the sway too long, and his pride was too great to be conquered so easily. He secretly bought some of his opponent's productions and slyly used them to assist him. He even allowed certain of his subordinates to go out into the country with the knights of the other, but only to laugh at the results of their journeyings. Where are all the beautiful colors of these trees and flowers? he would ask. True, you have shape and light, and shade and perspective, but what are all these without color. They are as faith without works, as works without charity; and to this day old Delusion hangs on to this query as his last chance for victory; but Fidelity, hard at work, calmly replies: "Give me time, and I will yet supersede you even in that particular; with me all such things are possible."

And this is as far as we are able to tell the story of these two giants. Still they fight—still the battle rages. Who are they, and who shall win?

NEW STEREOSCOPE PICTURES.

We are glad to see that outdoor pictures are becoming rapidly and vastly popular. For a time the carte-de-visite seemed to have displaced the stereoscopic picture; but, tired of them, the public seems to have gone back to their former love, and the demand for pictures for the stereoscope is constantly increasing. More particularly is this the case for views from nature. Photographers, feeling the demand pressing upon them, are turning their attention to this kind of work, and are improving very much. Two or three years ago we could only count two or three who were really making first-class outdoor work. Carbutt, Moran, and Bierstadt Bros. seemed to have ruled; but now others have entered the arena, and we have before us a set of views, which we shall describe, that are indeed most beautiful and excellent. We are not told with what lenses they were made; but in distance, sharpness, tone, and general manipulation, they are all that could possibly be desired. When we say this, further remarks are unnecessary. They came to our table during one of the late sweltering days, while we were toiling and melting, and it was a real pleasure to lay our pen aside for awhile and examine them. They were accompanied by the following letter:

"Littleton, N. H., July 9, 1866.

"Mr. Editor: Thinking, perhaps, you would like to know what some of the readers of *The Philadelphia Photographer* are doing this season, we have sent you by mail a package of twenty-six views, from negatives made by us, hoping that you will receive them in good condition.

"The money paid by us for our subscription for *The Philadelphia Photographer* we consider the best investment we have ever made, and do not receive one number but what we get information worth more to us in dollars than we paid you for the whole year.

"If you should visit this section of the country, we would be pleased to have you give us a call, and we will try and show you the realities instead of the counterfeits of our grand old mountains.

"Respectfully yours,

"Kilburn Bros."

Such good letters are very cheering, and better to us than gold. We wish our readers could all look over these beauties, for our description of them can convey but a tame idea of them.

Four views from Mount Auburn Cemetery, including the "Chapel," "Hazel Dell,"

"Bowditch," and "Lawrence" Monuments, are all gems of art, well taken, and nothing wanting. They are followed by the "Ordnance Park," at the Charlestown Navy Yard, and pictures of some of the fifteen-inch guns, that are so persuasive in war times. "Making Maple Sugar" is a charming picture. On the snowy ground the hardy woodsmen are at their work. The fire is burning finely, the steam arising as high as the frosty air will allow, and the patient men stand or sit, half asleep, watching the boiling syrup. The snow-shoes lie against the tree, and buckets and barrels standing around suggest that maple sugar is plenty in that region, though requiring cold and patient work to secure it. We pass this, and now find a series of White Mountain views, that are most deserving of an immense sale. These views, having been taken this season, have the charm of being in their winter clothing, which makes them differ from any we have in our location. Except in this respect, those of Glen Ellis Falls, Silver Cascade, Crawford Notch, Profile, Franconia Notch, Basin, and Mount Webster, are similar to those before noticed as coming from others. Mount Washington is tipped with snow here and there. Pulpit Rock is so covered with snow and icicles as to be almost unrecognizable, making a beautiful view. The Pass of the Dixville Notch; two views of the Pool, Franconia Notch; four views of the Flume, above and below the Boulder, from different points; Flume in the Franconia Notch; and a view on the Pemigewasset, are all very fine, and show most unmistakable evidence of a close acquaintance with the Frost King.

The "Tip-Top House," Mt. Washington, is beautifully photographed, and we long for a view at the world below from its summit. A view of Mount Lafayette, from Franconia, shows the former still covered with snow, and holding its hoary head high above its neighbors. An Ice Jam, on the Ammonoosuck, is the subject of another scene common in that region in the spring time. It is a regular jam. The "Lake of the Clouds," and a "Cloud View" from Mt. Washington, are entirely different from anything we have before seen, and are the gems of this beautiful series. We are accustomed to pointing our cameras upwards to secure the clouds; in this case the artist has climbed up far above them and taken their picture. The effect is grand. The floating clouds hide from our view all the busy world and its beauties below, and nought is seen but their floating, shapeless forms, and the high peak on which the camera stood.

We thank these gentlemen for the great pleasure they have given us, and we are sorely tempted to accept their invitation. Our only wonder is, that while up in that region they did not secure some nice negatives for our picture in some future number. We hope they will do so yet. They certainly have been very successful, and we are glad to add other names to the list of our first-class landscape photographers. We are glad to know they are increasing, and hope they will continue to do so.

In the same mail with the above we received from Mr. J. B. Heywood, of Boston, another series of his beautiful stereos, from negatives just made by him, with the following letter:

"Boston, July 9, 1866.

"Editor Philadelphia Photographer.

"Dear Sir: As five dollars per year is so small a price for your journal, I send you a package of views as part payment for the deficiency, and also to let you see if your subscribers are improving under your instructions. We all know you take as much interest in our beautiful art as any amongst us, and know it will give you satisfaction to be kept posted up on our work. I find, in travelling about, there are some photographers who do not take your journal. I tell them to subscribe, or close their places of business, for they cannot afford to do without it.

"Mr. F. Rowell is about moving into his new gallery, 25 Winter Street, and will send you some specimens of his work made under the new light, and also photographs of the light, which, I see by your journal, is on the same principle of Silvy's.

"Respectfully yours,
"J. B. Heywood."

Accompanied by such a letter, these pictures are particularly acceptable, for while enjoying them, we may feel that they are

in return for pleasure we have humbly tried to give. Mr. Heywood's views are published by Mr. Frank Rowell, and our readers will remember our notice of his beautiful pictures of Niagara in Winter, &c. &c.

The views now sent are of Lake Winnipiseogee and White Mountain scenery. They are so nearly alike in beauty, and so numerous, that our readers cannot fairly judge of them by the brief notice we are able to make of them. The mountain series embraces a number of views entirely new to us. Mount Kearsarge, from Sunset Hill; Silver Forest, Mount Washington; North Conway and White Mountains, from Sunset Hill; Round Mountain; Mount Washington, from the Glen; and two beautiful views of the McMillan House, embrace the mountain series, and all seem to be from new points. The Boulder at Bartlett shows this mighty monument of nature with great beauty. The Cathedral, North Conway, so called on account of its resemblance to a cathedral, is a wonderful formation of rocks, and a most interesting picture. Storm Clouds rising from the Valley, as seen from Mount Washington, make another very curious picture, not often to be secured, but in this case very nicely captured. Without the instrument, it looks like a grand conflagration in the woods. "*Solitude*" is the title of a very pretty picture of a very pretty young miss seated all alone amid the wild mountain shrubbery and trees, looking the very picture of solitude. The picture is well chosen and well named. These are followed by pictures of "The Artist's Bridge," a truly tempting spot, that makes one sigh to see it this hot weather. "A Foggy Morning on the Artist's Brook," and "A Study on the Artist's Brook," North Conway, all have their peculiar charms.

The river and lake series comprise new views of the Mote Range from the Saco; Hart's Ledge; Narrows Bridge; View on the North Branch, Bartlett; White House Ledge, from the Saco; Chocouna Lake and Mountain; and Nickerson's Mill. The latter is one of the very best of all. The reflection of the old mill in the water is very fine. We hope the artist will secure that picture for our Journal the next time he visits that locality. It is a splendid picture. The cataract series is composed of many new views of the Jackson Falls, upper, middle, and lower, and above and below them. Diana's Baths, North Conway; Crystal Cascade, Glen Side; two views of Goodrich Falls, and one of the Artist's Falls, North Conway, are the most successful of these, and every one a gem in itself. In the latter there is a face on one of the mossy rock sides looking like that of some aged hermit.

The Lake Winnipiseogee series embraces views of Red Hill Pond; Centre Harbor; Artist's Cove; Steamer Lady of the Lake, from Weir's Landing; and the Lake from the Senter House. They are all quite equal to Mr. Heywood's other efforts; and we are glad to say that there is not a picture among the whole of them that we can find fault with. Both he and Messrs. Kilburn Bros. have our best thanks; and feeling, as we do, a *personal* interest in the success and progress of each one of our readers, we know they will not censure us for telling them how nicely some of their co-workers are getting along. Success to them all; and do not forget next time you go out, to make us three or four negatives for illustration for *The Philadelphia Photographer.*

LECTURE ON PHOTOGRAPHY.

BY COLEMAN SELLERS.

Third Lecture.

Delivered January 26, 1866.

LADIES AND GENTLEMEN: Last Friday evening I explained to you the process of making the negative, and told you that what we call the negative is the transparent type used in printing the positive upon paper, or glass, or any other substance. I told you that, in the art of photography, the salts of silver most used were the iodide, bromide, and chloride. I showed you how they were prepared by double decomposition, as the iodide of silver, bromide, and chloride of silver from the salts of the metals, as for instance the chloride of silver from common salt and nitrate of silver, and the iodide and bromide of silver from iodide and bromide of ammonia and nitrate of silver. I told you also that these salts were not similarly affected by light. They do not all blacken under exposure. This is the case with

chloride of silver, which, if exposed to light for some time, becomes blackened. The iodide does not blacken, but receives an impress from the light or from actinism, and that impress becomes manifest by the future treatment with a developer; for instance, the treatment with iron which is ordinarily used in making the negative. Now, in producing the positive upon paper, we must make use of that substance which will blacken by exposure, and the substance most commonly used is the chloride of silver. I have, in this tall vessel, some ordinary table salt or chloride of sodium dissolved in water; in this glass in my hand, there is some nitrate of silver dissolved. Now, as I told you before, the nitrate of silver does not blacken by exposure to light. Even if it is dissolved in water, if the water is pure, there will be no change at all; but if you put some of the solution of silver on your hands, your hand will blacken upon exposure, owing to the combination of silver with the organic matter of your hands. Now, I shall pour this silver solution into the water containing salt. You see the precipitate; the white substance deposited is the chloride of silver. Double decomposition has taken place, the silver has united with the chloride, and formed the chloride of silver which is an insoluble substance. Nitrate of soda has also been formed, but being soluble, remains in the solution. This substance, this white chloride of silver as I said before, will blacken upon exposure to light.

To make a print with the chloride of silver, it will become necessary to spread it upon some surface, as over a sheet of paper or glass or anything upon which you wish to produce the picture. If we used paper for that purpose, it would be very difficult to spread the powder evenly over the surface. Therefore, we will have to do as in the negative process, namely, put the iodide into the collodion, and convert it into the iodide of silver, by putting it into the silver bath. In this case we will salt the paper. That is, put over its whole surface some ordinary salt, by dipping it in a solution of ordinary salt and water, and then after that, flow some silver over the surface of the paper. Double decomposition will then take place, and the chloride of silver be formed over the surface of the paper, penetrating its substance, also, to some extent.

Now, paper used in the photographic processes must have some peculiar properties. In the first place, it must be sufficiently well sized to enable it to withstand the various washings that it has to go through. In the second place, to be so entirely free from every chemical substance that the delicate reactions which will take place on the paper will not be interfered with. All the paper used for photographic purposes comes to us from Europe, costing an enormous amount of money, and there is no reason why it should not be made in America. Some few years ago a sample was sent to me of the home-manufactured paper for trial. I found upon silvering it there was no change to be noticed; but upon exposure under the negative, the picture would only partially appear, and over the whole surface there would be sundry lines and marks, as of the cloth upon which the paper had dried, showing the presence of some chemical substance which was neutralizing all my endeavors to get the paper in the proper condition. The difficulty was not thoroughly understood by the manufacturer, and the matter was dropped. But I do hope some American papermaker will produce this paper, as it sells for a high price, and can only be had from abroad. The paper which I now show you is entirely free from chemical substances. The first step will be to saturate it with salt, or put salt on the surface. I allude to plain paper; there are two kinds of paper used in photography. What we call albumenized and plain paper. You all know that there is a difference in the appearance of the photographs usually made, as some have a high gloss, while others have a dead surface. The latter are on plain or unalbumenized paper. I will first call your attention to the preparation of the plain paper. I have here a sheet of it. I wish to cover it with a solution of salt. To do this, it must be immersed for a short time in a solution of salt and water, in this large dish. This is merely ordinary table salt dissolved in water, about half an ounce of salt to the gallon of water. It scarcely has any taste of salt to it. It must be rapidly passed through, in order to

get a coating of salt as superficial as possible, and afterwards dried. There is nothing so convenient for drying the paper as the patent clothes-pins, which readily hold the corners of the paper. To immerse it, take hold of the upper edge of the paper by the teeth, and the two lower corners by the hands, and then by a quick motion it is passed through the solution. Then drain off the solution, and hang up and dry. In order to render the print as superficial as possible, there has lately been introduced another kind of paper. This paper has been put into the market by Mr. Anthony. It is called porcelain-surface paper, coated by some substance which prevents the salt from entering the paper, and coated with silver in the same manner as the plain paper, and I shall allude to the cause of the fading of prints, and then you will see the advantage of this kind of paper. Now, this illustrates part of the process technically called salting.

There are five separate, distinct, and different steps in making positives on paper. There is the salting, the silvering, the printing, the toning, and what is called fixing. I have alluded to the salting of plain paper, or passing it through a saline solution. The albumenized paper is also salted. But it is not put on only as *salt*, but mingled with the albumen or white of eggs. It is a difficult process to do, and not worth your while to practise it yourselves. It is much better to buy paper thus prepared.

Here are some pieces of albumen paper. It has a high gloss upon it. To prepare it, the whites of a great many eggs are mixed in a dish with a small quantity of salt, beaten into a froth so hard that a spoon will stand upright in it; it is then allowed to stand for several hours; a great deal will subside. Albumen which has run down into the dish is carefully poured off, and the paper is floated upon the surface of it. It is allowed to remain there for a short time, then raised and hung up to drain, generally hung up diagonally. The two kinds of paper, plain and albumenized, require different treatments in the silvering process. The nitrate of silver is silver dissolved in nitric acid, which I explained in my last lecture. But when silver is put in nitric acid, it does not dissolve; it first oxidizes, and we have oxide of silver, which is then dissolved. I want you to bear that fact in mind, because, in mixing with ammonio-nitrate of silver, I would like to explain the reaction which takes place. I have in this glass one ounce and a half of nitrate of silver. It has been weighed to save time. I wish now to prepare sixteen ounces of ammonio-nitrate of silver. This ounce and a half of silver I will dissolve in a pint of water; nitrate of silver dissolves quite rapidly in water, and yet it gives a slate-white opalescent look to the water. This is due, however, to slight impurity in the water from the presence of the traces of chlorides, which unite with the silver. Now, from this solution of nitrate of silver, I will pour off a small portion which is to be reserved for a future operation which will be explained to you in a few moments. I told you nitrate of silver was made by dissolving oxide of silver in nitric acid. Now, if we add ammonia, we cause all silver in the form of oxide of silver immediately to fall to the bottom. Oxide of silver is soluble in several different substances. In nitric acid, in ammonia, or in nitrate ammonia, *i. e.*, nitric acid and ammonia. If I pour some of this concentrated ammonia into this silver, you will see what a change will take place. It becomes of a very dark color like coffee or chocolate. This is the oxide of silver which is being deposited. But if I continue to add the ammonia (this part of the process has to be done with great care), I will have an excess of it—a sufficient quantity to redissolve the oxide of silver which has been thrown down by adding it slowly; it will finally clear the liquid, and all this silver will be redissolved. It seems singular that the same substance should have the power of at first throwing down the oxide of silver, and should then redissolve it. Now, I have added too much; I did it purposely. I wanted to show you how it would be entirely cleared. The reason I first saved this small quantity was to add and produce a turbulency. I wanted it to be a little muddy. I may not have kept a sufficient quantity back. I added the ammonia carelessly towards the latter part. No! that is right. A very little more silver added to it will bring the degree of muddiness which

I want. In that condition there is no excess of ammonia; adding this ammonia to the nitrate of silver has made the glass quite warm. Now make up the bulk to sixteen ounces with water. We now have the silver solution for plain paper. In the condition which you see it here it is not fit for use; it must be filtered. This is readily done. In filtering such solutions it is not good to use the filtering paper. We use a little common cotton, wetting it first with alcohol, and then with water. The water, you notice, wets it very readily, when it has been first moistened with alcohol. I place the cotton in the neck of this funnel; into this we will pour the solution; some of the silver will run through comparatively clear, but the reason it does not run entirely clear is owing to a small portion of water being in the cotton. Practically it is clear enough. It is not necessary to wait for the paper which I have salted to dry. I only did it to show how to salt the paper. I have a sheet, salted and dried before the lecture. The side of paper which is best for photographic purposes is that side which, upon looking across by reflected light, you can see certain lines or marks upon the paper from the felt upon which it has been dried; prints are usually more brilliant, when made on this side of paper. Plain paper is not floated upon the silver; albumenized paper is always floated upon the surface of the silver. The reason this is not floated is, because it rapidly deteriorates the ammonio-nitrate of silver, and it is better in that case to pour it upon the surface of the paper, in order to spread it evenly over the surface. You make use of a swab prepared from ordinary Canton flannel wrapped very close. This one has been used a great many times. The silver is poured into the middle of a sheet of paper; then it is spread over the surface. Take it almost up to the edge, and not run over the edge. There is no use of silvering the edges, because they are not used in making the print. You can conduct this part of the operation in a very leisurely manner. It need not be done in darkness; there is no hurry about it. It can be done in an ordinarily lighted room. The chloride of silver is not very sensitive to light till it becomes dry. Having spread it over as thoroughly as it can be done, seeing there is no spot untouched by the fluid (for every part untouched would be white in the print), then gather it up and pour the excess of silver back into the bottle. It should never be poured into the bottle into which you are filtering, but into the stock bottle. This paper then should be hung up to dry. Albumenized paper, if treated with this same liquid, would lose all its gloss; it is so alkaline. It would act on and dissolve off the albumen, and leave the surface like ordinary plain paper. Therefore, a great many experiments have been tried, to determine the best preparation of silver for the treatment of that particular kind of paper, and what is now most commonly used is the modification of the ammonio-nitrate process; the solution, however, is much stronger. In this case we dissolve two ounces of silver in a pint of water, instead of an ounce and a half, as in the strong solution. There are a great many different formulæ; it would be difficult to recollect them all. Here is a small graduated measure, fitted for measuring small quantities. If filled to that point, it will be an ounce; each of these marks indicate drachms. There are two ounces of silver used in making the solution. I employ two drachms of concentrated ammonia, pouring that into it. We have the same reaction. It discolors it in the same manner as in the first experiment. Now, to clear it, I have here a saturated solution of nitrate ammonia. This nitrate ammonia is the same salt as that used in the making of laughing gas. Now, we have to add sufficient water to it to make a pint of fluid; this is also slightly muddy, and it will be necessary to filter it, and treat it in the same manner as we did the first. While the silver is running through the filter, I would like to say a few words about the peculiar action of the ammonio-nitrate of silver as it is called. We want some salt of silver in solution which yields its silver to the paper in the form of chloride of silver. We do not want it to penetrate deeply into the paper. Those are the best prints which have the impression upon the surface, not deep into it. Therefore, we should employ some solution of silver in which the reaction is very quick and very decided when it comes in contact with the

chloride of sodium. Now a silver solution yields itself up very much more slowly when dissolved in nitric acid, than when dissolved in some other substance; in ammonia, for instance. Therefore, the use of ammonio-nitrate of silver furnishes us with a silver in solution so feebly held there as to be more readily parted with, to unite with the salt in the paper. We have now this sufficiently filtered to apply to the surface of the paper. Albumenized paper is never washed over as is the plain paper. But the paper is floated upon the surface of the silver solution. The floating is done in this manner. It is taken by one end and lowered into the solution till it floats over the whole surface. In order to be sure there are no bubbles of air, lift up the paper; if there are any, they are to be brushed off. The paper curls up, but it will soon straighten out, and should never be removed till it has become entirely straight, and feels slightly moist on the back. This is called silvering the albumenized paper. When the paper has been taken from the silver bath, it has a thin film of chloride of silver over the whole of it; but it has also in addition a film of free nitrate of silver over the whole surface of it. If we were to wash it off, the image would be feeble, not brilliant. It is the same in making the positives upon paper as in making negatives. The free silver is quite essential to both the processes; chloride of silver alone is not well adapted to the purpose. In raising it out of the silver bath, observe the same rule as in drawing out the negative; for, if I should raise it rapidly, the water would run off from it in a stream. But if, upon the contrary, I should raise it very slowly, I give time for the gravity to act, and the water then leaves the paper; and as we draw it up, it comes from the solution comparatively dry. You see there is no dropping. Mr. Hemphill will take this, and dry it very rapidly over the stove, as I wish to use this piece in printing a picture for you.

The next step of the preparation of the paper is to render it quite as alkaline as if for silver in the ammonio-nitrate solution. To do that, we will allow the fumes of the concentrated ammonia to come in contact with the surface of the paper. After it is dry, we will submit it to the fumes. Now, this fuming of the paper is a very important thing. I am very glad to say, it is an American discovery entirely, first introduced by Messrs. E. & H. T. Anthony, of New York. It renders the paper very sensitive; makes a much more brilliant print. When it was made public first, and the operation was promulgated through the medium of the various journals of Europe, it was laughed at and ridiculed on every side; but now I do not suppose there is a single photographer in any quarter of the globe, who does not use this fuming process. And when one has once used it, and is compelled to go back to the old way, he cannot produce good work; there is such a marked degree of advantage to be derived from the process of fuming. The fuming may be conducted in any kind of box at all. I have selected one of Prof. Morton's boxes in which he has had some of his apparatus. In the bottom of this box, put some of the aqua ammonia; then, when the paper is dried well, put it in, and close it down. In a few minutes it will be sufficiently impregnated to answer the purpose.

The quantity of ammonia which the chloride of silver will take up is surprising. There is a great deal of doubt in the minds of chemists as to the peculiar nature of these compounds of silver. The simplest solution of it, one we most readily understand, is that which I have given to you, namely, that the oxide of silver or ammonio-nitrate of silver is an oxide of silver dissolved in nitrate of ammonia, and that it gives up its silver more readily to the chloride of sodium than plain nitrate of silver would. But in my usual plan of silvering, I make it to be a longer time in contact, and so putting it into the fuming-box, bring it into precisely the same condition. Many people prefer doing so, using the acid solution in the nitrate of silver for producing a paper which does not turn yellow; they can keep it in an ordinary room. It will keep white for several days. This paper which I have this evening prepared deteriorates very rapidly. If silvered in the morning, by night it would be yellow or even quite brown; not fit for any photographic process. So, some people prefer using plain nitrate of silver, then

fuming the paper. That particular plan of treating plain paper is followed by Mr. Walker, the photographer in the Treasury Department in Washington, D. C. While the fuming process is going on, I will add a few words about concentrated liquor ammonia. Before its introduction into photography, it was used only to a limited extent for chemical purposes. The substance itself is made by passing ammoniacal gas into water. The water has to be made cool. Before the first year of its introduction into the art of photography was ended, the whole stock was exhausted, and chemists were put to their wits' ends to supply the demand. Now, it is produced in enormous quantities, and its sale has increased fivefold. Every bottle has a printed label upon it, containing a caution which it is very proper to observe.

(To be continued.)

MICROPHOTOGRAPHY.

Editor Philadelphia Photographer.

Dear Sir: In answer to your note of August 2d, I take pleasure in communicating for your Journal the process so successfully employed in the Army Medical Museum in the preparation of photographs with the highest powers of the microscope. This process, indeed, so far as the photographic part of the work is concerned, presents nothing new, the improvements made having reference wholly to the optical contrivances. I have, therefore, sent short accounts of it to the "London Microscopical Journal," and to "Silliman's Journal," in this country, in which those of your readers interested will find all the necessary details. A short account of the process was also published in my report of October 20, 1865, contained in the Surgeon-General's "Circular, No. 6," on the nature and extent of the materials available for a medical and surgical history of the rebellion.

The essential parts of the process are, the use of object-glasses, corrected so as to bring the chemical rays to a focus, and illumination by violet light. The steps are, briefly, as follows:

The microscope is used in a dark room, the windows of which face to the south. Outside of one of these windows is a shelf, on which stands a Silberman's heliostat, so arranged as to reflect the direct rays of the sun upon the mirror of the microscope, which is fixed on an arm outside of the window, and, in its turn, reflects the sunlight through a short tube in the shutter. The microscope is placed at the inner extremity of this tube, in a horizontal position, while at the outer end hangs a plate-glass cell, filled with a saturated solution of ammonio-sulphate of copper. Through this solution the sunlight must pass to enter the tube, and in so doing all but the violet ray is absorbed. Two steel rods, attached to the mirror, permit it to be adjusted without opening the window, and a black velvet hood thrown around the stage of the microscope prevents any leakage of light into the room from the space between the condenser and the objective of the instrument. With high powers, an ordinary achromatic condenser is used. or, in some cases, a pair of simple plano-convex lenses, with a large central stop, may be advantageously substituted to give greater obliquity to the illuminating pencil. Objectives properly corrected for illumination with violet light have been manufactured for the Museum by Mr. W. Wales, of Fort Lee, N. J., who has produced a three-inch, four-tenths, one-fifth, and one-eighth, the quality of which, in my opinion, is all that can be desired. The plateholder, properly centred, slides on a horizontal walnut frame, by which it is held perpendicular to the axis of the microscope, and can be clamped at any distance not exceeding nine feet from the stage. By the side of this frame is a round rod, on the extremity of which, next to the microscope, is a grooved wheel. The milled head of the fine adjustment of the microscope is also grooved, and a silk cord over the two enables the operator to focus the microscope by means of the rod, no matter how far from the instrument the plateholder may be.

To arrange the illumination, position of the object, &c., the operator stands by the microscope, puts in an eye-piece and focusses in the usual way, adjusting the mirror by means of the steel rods. The violet light is readily borne by the eye, even when the whole power of the sun is employed in the

illumination. This adjustment completed, the eyepiece is withdrawn, and, going to the plateholder, the final adjustment is made by turning the rod. In this final focussing, the object is viewed with a focussing glass on a piece of plate-glass held in the plateholder. The sensitive plate is then exposed in the usual way, the time required being from less than a second to twenty minutes, according to the power employed.

For low powers, the objective alone is relied on to give the necessary size. To obtain the highest powers, however, an achromatic concave is placed at the upper extremity of the microscope body. The one now employed gives a perfectly flat field, and increases the number of diameters between six and seven times. This concave is about half an inch in transverse diameter, and has an angle of aperture of 28°.

Many objects, as, for example, some of the tissues, certain diatoms, &c., present interference lines when illuminated with a powerful pencil of parallel rays, and in order to prevent this false appearance, it is necessary to interpose a piece of ground-glass in the solar pencil to disperse the light; in this case, the time of exposure necessary is, of course, much increased.

By these contrivances, we have been enabled to produce pictures of the utmost sharpness, and perfectly satisfactory in every other respect, with powers up to 2500 diameters; and these pictures bear a further enlargement of from six to eight diameters in a copying camera. We have thus obtained excellent pictures, with no less than 19,000 diameters.

If the foregoing points are duly attended to, it matters comparatively little which of the very many excellent photographic processes in use for ordinary work is employed. As to collodion, many different samples have been used with good results, among others, for example, one containing two and a half grains each of the iodide of ammonium, the iodide of cadmium, and the bromide of ammonium, to the ounce of collodion. With the highest powers, a collodion containing two grains of bromide, and five of the iodide of magnesium to the ounce, has been found advantageous, the resulting nitrate of magnesia preventing the plate from drying during the long exposure necessary. The nitrate bath is used of the strength of forty grains to the ounce, and is acidulated with nitric acid. We use the ordinary iron developer, restrained by the gelatine solution, on the plan proposed by Brevet Major W. Thomson in a recent number of your Journal. The picture is fixed with hyposulphite of soda, or cyanide of potassium, and afterwards intensified with iodide of mercury dissolved in a solution of iodide of potassium, and, when necessary, still further with Schlippe's salt. Great intensity is especially required in pictures of the diatomacea, and other lined objects. The negative is finally varnished, and prints taken on albumen-paper in the usual way. I send you samples of these prints. It is to be remarked, however, that for the Museum we prefer transparent positives on glass, mounted before a piece of ground-glass. A fac-simile of the field of the microscope is thus obtained. I should take pleasure in showing any of your readers who may visit the Museum the splendid series of specimens prepared by this method.

It may be remarked that, with the very highest powers, such as, for example, the new Powell and Lealand's one-fiftieth objective, one of which is in the possession of the Museum, the correction of the objective to suit the index of refraction of the violet ray is so small as to be practically unimportant. At least, by illuminating this lens with monochromatic light, we have obtained with it excellent photographs, one of which I send you. This remark, however, does not apply to the one-eighth, or to any lower power. I have not yet experimented with the one-twelfth or one-sixteenth, but believe, also, that with these glasses the special correction will be found indispensable to the best results. I may also say, that with the one-eighth, and the amplifier, we have obtained photographs with magnifying powers as great as we have been able to obtain from the one-fiftieth. Comparative pictures taken from the same object give the preference, in some particulars, to the one-fiftieth; in some, to the one-eighth and amplifier.

The process I have above sketched is employed in the Museum in preparing the pathological illustrations for the medical

history of the war, and diatoms, &c., have been employed by us simply as test objects.

I cannot close without speaking in praise of my able assistant, Brevet Captain Edward Curtis, Assistant Surgeon U. S. Army, to whom the whole manipulation has been intrusted, and who, from the earliest experiments made, now a little over a year ago, to the ultimate realization of my project, has shown himself most skilful and ingenious. Almost all the pictures hitherto taken have been his work, as you will see by their labels; and if I have placed also in the package a few of my own, it is simply to encourage others to attempt to work in this direction, by showing that success lies now in the process, and not in any single hand.

Truly yours,

J. J. Woodward,

Ass't Surgeon and Brevet Major U. S. Army.

Dr. Woodward's paper was accompanied by fourteen very handsome specimens. It does not seem possible that anything could be better. We have shown them to several parties who are interested in that particular field, and all have concurred in our opinion. The greatest credit is due the gentlemen who have displayed so much skill and ingenuity in producing these wonderful results.

The series embraces pictures of, "A Section of *Cartilage* from the rib of an ox," showing corpuscles, just after division, still inclosed in one capsule, magnified 370 diameters; "Coscinodiscus Omphalanthus," magnified 370 diameters; "Pleurosigma Attenuatum," magnified 337 diameters; "Pleurosigma Formosum," magnified 337 and 2540 diameters; "Heliopelta Leeuwenhoekii," magnified 235 and 375 diameters; and "Pleurosigma Angulatum," magnified 12, 118, 2344, 2540, 2540, 19,050, and 19,050 diameters. The latter seems almost improbable, but is even so, as the pictures verify. One of those magnified 19,050 times, is enlarged from the one magnified 2344, and the other from the negative enlarged 2540 times. Some of these are very beautiful indeed, showing the wonderful power photography sways in this branch of science.

It seems almost incredible that a pore or indentation in, or any part of, the shell of a fish, too small to be seen with the naked eye, can be so enlarged as to appear like a bullet-hole. One curious thing is noticeable in the specimens magnified the greatest number of diameters; close by they resemble a riddled target, full of round holes. At a distance, the round figures resemble hexagonals in shape; this effect is even more noticeable in the smaller pictures. The "Heliopelta Leeuwenhoekii," of 235 diameters, is the gem of the whole, though they are all unequalled. The specimens are mounted on white boards, with a black lithographed centre, which makes them appear to great advantage. Certainly, Dr. Woodward and and Dr. Curtis deserve the congratulations of all interested in this beautiful branch of photographic science.

MICROSCOPIC PHOTOGRAPHS.

We have heard much of the mammoth magnificent views of California, of the tremendous reaches of our own favorite Globe, the Steinheil and the Dallmeyer wide-angle lenses; but, to come down to the day of small things, we have not yet seen anything in the photographic line more beautiful than the tiny pictures now made and inserted in little microscopes. No doubt many of our readers have seen them, and know what they are; but as they are destined to, and certainly should, become very popular, we shall all want to know all we can about them. Hence, our remarks, which we have been led to make by a visit to the novel establishment of Mr. J. H. Morrow, microscopic photographer, 629 Broadway, New York.

In Europe this branch of photographic portraiture is making rapid strides. At Manchester, England, there is a very large establishment engaged in producing not only portraits, but all sorts of copies, views, &c., on slides for the microscope. In Paris there is a similar establishment, under the care of M. Dagron, we believe, *employing over one hundred and thirty persons in this branch alone.*

In New York, Mr. Morrow has opened his rooms, and is prepared to do any amount of work, which, from a number of specimens we have seen, is most excellent and charming. We were shown opera-glasses, watch charms, finger-rings, breastpins, eye-glasses,

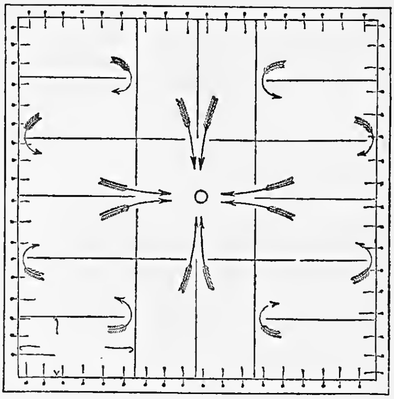
knives, canes, penholders, pencils, pipes, portemonnaies, &c., in great variety. By close examination, a little sparkling dot would be found, not as large as the head of a pin. Looking through these, we would see most wonderful beauties, such as masonic certificates, college diplomas, the Lord's prayer, portraits of fifty people, all distinct, or it might be the Cabinet, our own picture, or that of some other distinguished individual! The most beautiful application of this elegant process is to finger-rings. No matter what color the stone may be, it may be so ground as to be used as a microscope for viewing the picture of the one you love best or the least.

Mr. Morrow took great pains to show us his whole modus operandi of printing, &c., which was very novel and interesting. His establishment is the only one in this country devoted specially to that kind of work; but he desires that there should be others to make the process more popular, and in proper place advertises terms for teaching.

The process is very simple and easy, and the instruments used low in price, and not complicated. Fixty-six pictures have been made in one minute by a girl working six instruments at one time. Mr. Morrow's terms are reasonable; and he comes to us highly recommended as to reliability by other parties in New York, who are well known to our readers. This beautiful application of photography ought to be extended, and we hope it will. Mr. Morrow is now manufacturing largely for Messrs. Gurney & Son, and others, in New York. Please refer to his advertisement.

MILLHOLLAND'S IMPROVED WASHING TANK.

From Mr. J. A. Millholland, Mt. Savage, Md., we have received the plan described below, for a washing-tank for photographic prints. All photographers know the difficulty of keeping the prints in motion and apart from each other, while washing, and the result of their clinging together; these troubles may be removed by the use of Mr. Millholland's improved tank. It is not patented, but freely offered for the use of the craft at large.



It consists of an ordinary wooden tank, in which any number of partitions may be placed far enough apart to suit the size of the prints to be washed therein. Around the tank, near the bottom, a lead supply-pipe is placed, pierced with small holes, through which the water enters with considerable force. The partitions should be a little higher than the water-mark, and left unjoined at one end, so that the constantly moving water may run out from the prints in the direction of the arrows in the diagram, and out through the common centre, thus effecting a constant change of water, and making the washing of the prints thorough. The advantages of this apparatus are, that a constant supply of fresh water running among the prints, which, being held separated by the partitions, and having a speedy and thorough circulation through them, causes them to be washed as thoroughly and quickly as possible. We are all indebted to Mr. Millholland for his admirable and useful invention. He is the "engineer" to whom Mr. Sellers's letters were addressed.

On a Mode of Testing the Permanency of Photographic Prints.

BY M. CAREY LEA.

More than a year ago, I found it necessary to devise some satisfactory test for the permanency of paper positives, and was unable to find any advice upon the subject, even

in our best text-books, which seemed really useful. One of the tests which I tried and adopted has seemed particularly valuable. It was my intention to have described it and my method of using it earlier, but a press of other occupation has prevented me. This has had at least the advantage of enabling time to test the accuracy of its indications; and the result has been altogether satisfactory.

The substance which I employ *is dilute nitric acid.* The object was not to dissolve out metallic silver, which would have constituted a very false criterion, but to attack the weaker portions of the picture—those that suffer by the action of time and the atmosphere. It was found, that when pure nitric acid, sp. gr. 1.28, was diluted with twenty-four times its bulk of water, a fluid was obtained which had no action upon even very finely divided (precipitated) silver, and which, nevertheless, by continued action, destroyed weak prints.

On examining now, at the end of fifteen months since the first experiments were made, the specimens tried, it is found that of those prints upon which the acid acted powerfully (the sulphur toned), the *remaining halves*, which had been carefully preserved for comparison, and which had undergone no chemical treatment, *are faded.* I am, therefore, to that extent further confirmed in the belief that this test is reliable.

Yet, it is to be observed, that although "sulphur-toned" prints are thus completely destroyed by nitric acid diluted to the point just mentioned, still *sulphide of silver* is not at all attacked by it.

To illustrate upon this point, some sulphide of silver was precipitated by hydrosulphate of ammonia from the nitrate, was carefully washed, and, while still fresh and moist, was exposed to the action of the dilute acid. After remaining in contact for twenty-four hours in a warm room, the solution was tested for silver, and found to contain none. It thus appears that, even under the most favorable conditions, this dilute acid is incapable of oxidizing or altering even freshly precipitated sulphide of silver. Clearly, then, the weakness of sulphur-toned prints depends upon the presence of something else than sulphide of silver.

It may be said, that sulphide of silver formed in the *presence of organic matter*, such as is always present in albumen prints, has different properties, and acts in a different manner, and that the weakness of sulphur-toned prints depends upon this. Some view of this kind is, I think, held by the distinguished French photographer, M. Girard.

To test this point, I took some sensitized paper, and converted the whole of the nitrate of silver into sulphide with hydrosulphate of ammonia. This paper, uniformly black, was then exposed to the influence of the dilute nitric acid for five days; but no sensible lightening of its color was visible.

A point essential to be attended to is, that *pure* nitric acid shall be used, and especially acid free from the lower oxides of nitrogen, as any hyponitric acid present greatly increases its oxidizing power. The acid proper to be used is that which is prepared expressly for chemical analysis.

It will probably be found that this method offers, perhaps, the simplest and most effectual of all tests of the permanency of photographic prints. The great advantage is, that while it acts as an oxidizer of some power, it will not attack metallic silver, and consequently it spares those parts of the picture which we know by experience to be right, and directs its action to those substances whose presence, if they are there, we wish to detect.

The test is applied in the following manner. The print to be examined is cut into halves; one of these is placed in a wide-mouthed bottle, with a glass stopper, and the dilute acid is poured over it. The print can be examined at any time after immersion. A really good print, when taken out after two weeks' immersion, dried, and compared with the other half, ought to show no loss of strength whatever. Sometimes, indeed, the tone may be slightly changed, may even be darker than before; this is unimportant. But the print, after this prolonged treatment with the dilute acid, should have lost no particle of force and beauty.

I propose shortly to publish a description of the action of this and other tests upon prints produced by a great variety of processes, in which experiments great pains

have been taken to secure exact comparative results.

BERGNER'S IMPROVED PRINT CUTTER.

PATENTED JANUARY 31, 1865.

How to cut out photograph prints nicely, particularly those of oval shape, and for stereoscopic pictures, has long been a query unanswered. Several devices have been offered, but all thrown aside as being useless, and not answering the purpose. Mr. Theodore Bergner, of this city, knowing of this want, has invented an instrument for the purpose, which will be found by those needing them to supply perfectly the long felt want. They are made of the very best material, and are really a good article. As many as eighty thousand cartes-de-visite have been cut with one of them without dulling the instrument.

Fig. 1.

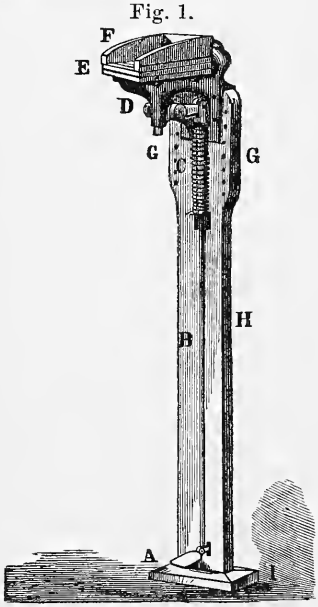


Fig. 1 represents one of these instruments of card size. A is a treadle worked with the foot, which communicates motion by way of the rod, B, to the plunger or lever, C. This plunger (C) works a steel plate of the exact size and shape of the print to be cut out, which plate is held by the iron framework, D. This steel plate acts as a punch, and is accurately fitted into two larger steel plates at E, which have a space between them to receive the print. The upper one of these larger plates is the shears or die, against which the smaller plate cuts by upward motion, while the lower plate, at E, serves as an accurate guide for the punch-plate. These larger plates are secured in proper position by screws, the lower one to the iron framework, D, and the upper one, or die, to the top piece, F. The shallow space between these plates is formed by the shape of the casting, which is so constructed as to make D and F all in one piece, screwed to the board, H. Into this space, at E, the prints to be cut are inserted, face upward, and, being all visible, can be easily adjusted so as to suit the form and position of the figure in the picture.

The picture is then cut out by working the treadle A, and plunger, C, which communicate motion to the cutting parts of the instrument in the manner described above.

In order that the instrument may be attached to any table or work-bench, of any ordinary height, it is fastened to the board, H, which is furnished with screw-holes, G G, and also with the base-board, I, which is fastened to the other obliquely, so that when placed level with the floor, it gives the whole instrument a forward motion toward the operator, making it much more convenient to insert the prints, and to get a view of them without the inconvenience of leaning over the cutter. This instrument is very perfect, and works like a charm.

Fig. 2.

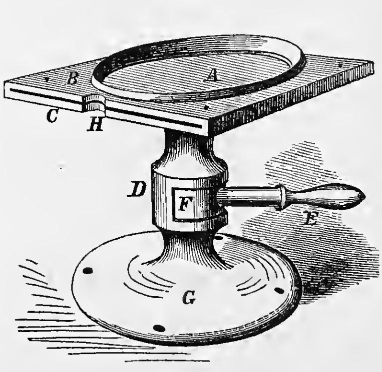


Fig. 2 represents an instrument of a very similar construction, which is used for cut-

ting out prints of oval shape, and may be made of any required size. It consists of the iron framework, D, G, the upper and lower plates, B, C, and the plunger, A. The upper and lower plates are held in place by metallic plates between them at the sides, both ends being open for the insertion of the prints. Motion is communicated to the working parts by the arm or lever, E, and cam F, which, being drawn toward the operator, raises the die-plate through the plates, B and C, and cuts out the print. The lever or arm is so adjusted as to spring back in place when released from the hand, which is also the case with the card size. H is where the prints are inserted, adjusted or removed.

An instrument is also constructed for cutting out stereoscopic prints, working the same as the one last described. It is made double, or with two cutters, and is provided with an elliptic die-plate, with a projection on one side, the upper edge of which is on a line with the bottom edge of the picture space, and therefore facilitates the levelling of both pictures by spacing any object or point on the same, equidistant from both levels. When the first picture has been cut out, and the second one is to be adjusted, the object previously spaced by the projection is again placed in the same relative position to the lower cutting edge, while the bottom waste strip from the first picture is brought in contact with a projection also in line with the other two bevelling edges, making the whole a very accurate means of cutting out pictures stereoscopically correct.

Several of these excellent instruments are already in use by our best photographers, and are considered invaluable. They are now being largely manufactured, and will be found advertised in our columns, to which please refer for further particulars.

THE NEW REVENUE LAW.

As we announced previously, photographers are now freed from the trouble, vexation, and various annoyances of affixing stamps to their pictures. Much effort was expended to secure this end, and for the sake of those most interested, we are glad it has been attained; and not only this, but the tax has been much reduced, which makes it pleasanter all around.

As all are doubtless anxious to know *the law*, we below print it as amended, and as it now stands in force. We extract from a copy kindly sent us by Hon. E. A. Rollins, Commissioner United States Internal Revenue, viz.:

"An act to reduce internal taxation, and to amend an act entitled, 'An act to provide internal revenue to support the Government, to pay interest on the public debt, and for other purposes,' approved June thirtieth, eighteen hundred and sixty-four, and acts amendatory thereof.

"*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That on and after the first day of August, eighteen hundred and sixty-six, in lieu of the taxes on photographs, as provided in 'An act to provide internal revenue to support the Government, to pay interest on the public debt, and for other purposes,' approved June thirtieth, eighteen hundred and sixty-four, as amended by the act of March third, eighteen hundred and sixty-five, That section ninety-four be amended by striking out all after the enacting clause, and inserting in lieu thereof the following: That upon the articles, goods, wares, and merchandise hereinafter mentioned, except where otherwise provided, which shall be produced and sold, or be manufactured or made and sold, or be consumed or used by the manufacturer or producer thereof, or removed for consumption, or use, or for delivery to others than agents of the manufacturer or producer within the United States or Territories thereof, there shall be assessed, collected, and paid the following taxes, to be paid by the producer or manufacturer thereof, that is to say: On photographs, ambrotypes, daguerreotypes, or other pictures taken by the action of light, and not hereinafter exempted from tax, a tax of five per centum ad valorem.

"*And be it further enacted*, That from and after the passage of this act, the articles and products hereinafter enumerated shall be exempt from internal tax, viz.: Photographs, or any other sun pictures, being copies of en-

gravings or works of art, when the same are sold by the producer, at wholesale, at a price not exceeding fifteen cents each, or are used for the illustration of books."

Following up the act, we observe that the committee has made the law so to read that all *light* pictures are taxed, magnesium and all. Mr. Waldack will not get his Mammoth Cave pictures free.

Photographers are also required to pay a license in addition to the above. It was enacted:

"That section seventy-nine be amended by striking out all after the enacting clause, and inserting in lieu thereof the following: That a special tax shall be, and hereby is, imposed as follows, that is to say: Photographers shall pay ten dollars. Any person who makes for sale photographs, ambrotypes, daguerreotypes, or pictures, by the action of light, shall be regarded a photographer."

It is now incumbent upon every photographer to keep an account of his gross sales of plain photographs, and to make returns to his assessor as often as required. How often this will be, we are not yet informed. The coloring on a photograph is not taxed.

There are other clauses in the new law, which, being of value to every one, we also extract:

"Sec. 66. *And be it further enacted*, That the Secretary of the Treasury is hereby authorized to appoint an officer in his department, who shall be styled, 'Special Commissioner of the Revenue,' whose office shall terminate in four years from the thirtieth day of June, eighteen hundred and sixty-six. It shall be the duty of the Special Commissioner of the Revenue to inquire into all the sources of national revenue, and the best methods of collecting the revenue; the relations of foreign trade to domestic industry; the mutual adjustment of the systems of taxation by customs and excise, with the view of insuring the requisite revenue with the least disturbance or inconvenience to the progress of industry, and the development of the resources of the country; and to inquire, from time to time, under the direction of the Secretary of the Treasury, into the manner in which officers charged with the administration and collection of the revenues perform their duties. And the said Special Commissioner of the Revenue shall, from time to time, report, through the Secretary of the Treasury, to Congress, either in the form of a bill or otherwise, such modifications of the rates of taxation, or of the methods of collecting the revenues, and such other facts pertaining to the trade, industry, commerce, or taxation of the country, as he may find, by actual observation of the operation of the law, to be conducive to the public interest; and, in order to enable the Special Commissioner of the Revenue to properly conduct his investigations, he is hereby empowered to examine the books, papers, and accounts of any officer of the revenue, to administer oaths, examine and summon witnesses, and take testimony; and each and every such person falsely swearing or affirming shall be subject to the penalties and disabilities prescribed by law for the punishment of corrupt and wilful perjury; and all officers of the Government are hereby required to extend to the said Commissioner all reasonable facilities for the collection of information pertinent to the duties of his office. And the said Special Commissioner shall be paid an annual salary of four thousand dollars, and the travelling expenses necessarily incurred while in the discharge of his duty; and all letters and documents to and from the Special Commissioner, relating to the duties and business of his office, shall be transmitted by mail free of postage."

We shall probably want to use this official next fall, when our delegation hopes to secure the removal of the tax entirely from photographs.

"Sec. 70. *And be it further enacted*, That this act shall take effect, where not otherwise provided, on the first day of August, eighteen hundred and sixty-six, and all provisions of any former act inconsistent with the provisions of this act are hereby repealed: *Provided, however*, That all the provisions of said acts shall be in force for collecting all taxes, duties, and licenses properly assessed, or liable to be assessed, or accruing under the provisions of acts the right to which has already accrued, or which may hereafter accrue under said acts, and for maintaining and continuing liens, fines, penalties, and forfeitures incurred under and by virtue thereof, and for carrying out and completing

all proceedings which have been already commenced, or that may be commenced, to enforce such fines, penalties, and forfeitures, or criminal proceedings under said acts, and for the punishment of crimes of which any party shall be, or has, been found guilty: *And provided further*, That whenever the duty imposed by any existing law shall cease, in consequence of any limitation therein contained, before the respective provisions of this act shall take effect, the same duty shall be, and is hereby, continued until such provisions of this act shall take effect; and where any act is hereby repealed, no duty imposed thereby shall be held to cease, in consequence of such repeal, until the respective corresponding provisions of this act shall take effect: *And provided further*, That all manufactures and productions on which a duty was imposed by either of the acts repealed by this act, which shall be in the possession of the manufacturer or producer, or of his agent or agents, on the day when this act takes effect, the duty imposed by any such former act not having been paid, shall be held and deemed to have been manufactured or produced after such date; and whenever, by the terms of this act, a duty is imposed upon any articles, goods, wares, or merchandise, manufactured or produced, upon which no duty was imposed by either of said former acts, it shall apply to such as were manufactured or produced, and not removed from the place of manufacture or production, on the day when this act takes effect. And the Commissioner of Internal Revenue, under the direction of the Secretary of the Treasury, is authorized to make all necessary regulations, and prescribe all necessary forms and proceedings, for the collection of such taxes, and the enforcement of such fines and penalties, for the execution of the provisions of this act."

A GENTLEMAN recently treated a handkerchief with nitric and sulphuric acid until it was converted into pyroxiline. He then handed it to his servant with instructions to have it washed and ironed without delay. When about to do the latter, the servant was rather astonished to see the linen disappear in a whiff as soon as the hot iron touched it.

ANCIENT PHOTOGRAPHY.

PART II.

Practical description of the process called the Daguerreotype, which consists in the spontaneous reproduction of the images of natural objects, in the Camera Obscura; not with their colors, but with great delicacy in the gradation of the tints. BY DAGUERRE.

(Translated for the Journal of the Franklin Institute, by J. F. Frazer.)

Description of the Process.—The drawings are made upon thin sheets of silver, plated upon copper. The thickness of the two metals should not exceed that of a stout card.

The process is divided into five operations.

The first consists in polishing and cleaning the plate, so as to render it fit for receiving the sensitive coating.

The second, in applying this coating.

The third, in submitting the plate thus prepared, to the action of the light in a camera obscura, in order to receive upon it the picture from nature.

The fourth, in causing this picture to appear; it not being visible when first taken from the camera obscura.

Finally, the fifth has for its object, the removal of the sensitive coating which would continue to be modified by the light, and would tend necessarily to destroy the impression altogether.

First Operation.—This requires a small flask of olive oil; very fine carded cotton; pumice ground exceedingly fine, tied up in a piece of muslin sufficiently thin to suffer the pumice to pass through it easily, when shaken; a bottle of nitric acid diluted with water in the proportion of one part (by measure) of acid, to sixteen parts (by measure) of distilled water; a frame of iron wire upon which the plates were put in order to heat them by means of a small spirit-lamp, and finally a small spirit-lamp.

As was before mentioned, the drawings are made upon silver plate. The size of the plate is limited by the size of the apparatus. It must, in the first place, be well polished. For this purpose, it is sprinkled with pumice (shaking it without touching the plate), and is rubbed gently, in a circular direction,

with cotton soaked in a little olive oil. In this operation the plates are laid upon a sheet of paper which must be renewed from time to time.

The pumice is re-sprinkled, and the cotton renewed several times. When the plate is well polished, it must be freed from the oil, which is done by sprinkling it with pumice, and rubbing it dry with cotton, rubbing always in curves; a good result cannot be obtained by rubbing otherwise. A small plug of cotton is then made, which must be wet with a little acid diluted with water as above mentioned. The plate is then rubbed with the plug, taking care to spread the acid perfectly over the whole surface of the plate. The cotton is changed, and the plate again rubbed, always in circles, so as to spread completely the film of acid, which should, however, merely touch, as it were, the surface of the plate.

The plate must then be submitted to a high heat. After having passed the lamp for at least five minutes under every portion of the plate, a light, whitish coating forms upon the surface of the silver. The action of the heat is then withdrawn. The plate is then quickly chilled by placing it upon a cold surface, such as a marble table. When it is cold, it must be again polished, which is quickly done, since it is only necessary to remove the whitish coat which has formed upon the silver. When the plate is well burnished, it is rubbed, as above mentioned, with the acid diluted with water, sprinkled with a little pumice, and rubbed very lightly with a plug of cotton. The acid must be renewed three times, taking care each time to sprinkle the plate with pumice, and to rub it dry, very lightly, with very clean cotton, taking care that the part of the cotton touched by the finger shall not touch the plate, since the transpiration would cause blurs upon the drawing. The humid vapor of the breath must also be avoided, as well as drops of saliva.

Second Operation.—For this operation we must have the box figured in Fig. 1. A rectangular frame of wood. Four small metallic strips of the same nature as the plate. A small hammer and a box of small nails. A little iodine.

After the plate has been fixed upon the frame by means of the metallic strips and small nails which are driven with the hammer designed for that purpose, the iodine

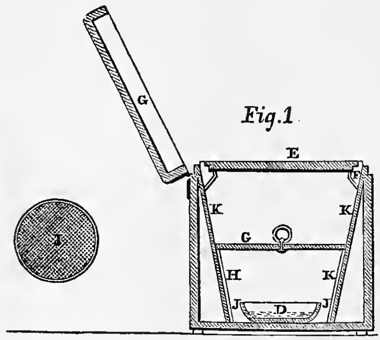


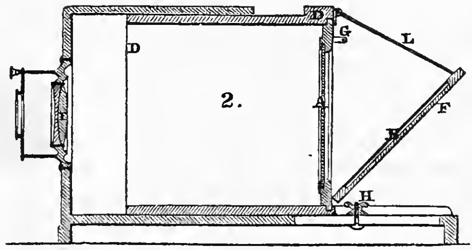
Fig. 1

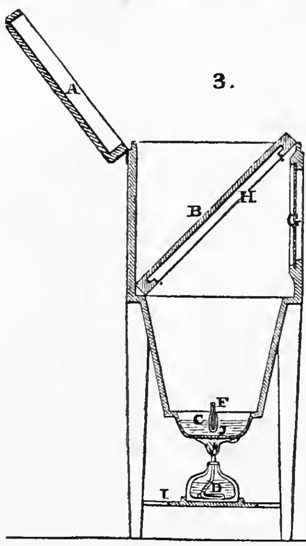
must be placed in the capsule which is at the bottom of the box. The iodine must be divided in the capsule, in order that the focus of emanation may be larger, otherwise, an iris would form at the centre of the plate which would prevent the obtaining a uniform coating. The wooden frame is then placed, the metal downwards, upon the small brackets fixed at the four angles of the box, and the cover is shut. In this position it must be left until the surface of the silver is covered with a perfect coating of a golden yellow color. If it be left too long, this golden coating will pass to a violet color, which must be avoided, since the coating is then not so sensitive to the light. If on the other hand the coating be not sufficiently yellow, the image would be produced with great difficulty. So that the yellow must be of a well-defined shade, this being the only one which is favorable to the production of the effect. It is very important in this operation that the temperature of the interior of the box shall be the same as that of the exterior of it; were it otherwise the plate in passing from the cold to the warm air would be covered with a slight coating of moisture very injurious to the results. The box must be placed in a dark-room, into which no light penetrates, excepting through the door which is left a little open; and when we wish to examine the plate, after removing the cover of the box, we take the board in both hands, by its ends, and turn it up quickly. It will be enough that the plate reflects a slightly illuminated spot as

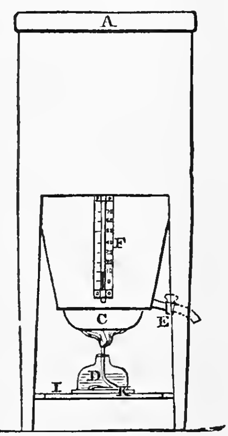
far off as possible, in order to see whether the yellow tint is sufficiently deep. The plate must then be quickly replaced in the box, if the coating has not attained its proper color; if, on the contrary, it has gone beyond it, the coating cannot be used, and the first operation must be recommenced from the beginning.

When the plate has attained the proper color, it must be placed in a frame which fits into the camera obscura. The light of day must be prevented from striking upon the plate; for this purpose, therefore, we use a candle, the light of which has much less action; this light must not, however, be suffered to strike too long upon the plate, upon which it will leave marks.

We pass then to the third operation, which is that of the camera obscura. We should pass as quickly as possible from the second operation to the third, or at all events we should not leave more than an hour's interval between them; after this time the compound of iodine and silver has not the same properties.







Third Operation. No apparatus is necessary for this operation except the camera obscura, Fig. 2. The third operation is that in which the picture is obtained by means of the camera. Objects illuminated by the sun must be selected as far as possible, because the operation is under these circumstances much more prompt. It may easily be conceived that as the result is caused by the light alone, the action will be quicker, in proportion as the objects are more strongly illuminated, and are naturally whiter.

After placing the camera obscura opposite to the landscape, or whatever other object we may desire to copy, the important point is to arrange the focus so that the objects may be defined with great clearness; which is easily done by drawing out, or pushing in, the frame of the ground glass which receives the image. When great precision has been attained, the movable part of the camera obscura is secured by means of the screw adapted for this purpose, and the frame of the glass is then withdrawn (taking care not to derange the camera), and replaced by the apparatus which contains the plate, and which fits exactly into the place of the glass. When this apparatus is properly adjusted, by means of the small copper buttons, the opening of the camera is closed, and the interior doors of the apparatus opened by means of the two semicircles. The plate is then ready to receive the impression of the view, or object, which has been chosen. Nothing remains but to open the diaphragm of the camera, and count the minutes by the watch.

This operation is one of great delicacy,

because nothing is visible, and it is utterly impossible to determine the time necessary to produce the effect, since this depends entirely upon the intensity of the light from the ojects which we wish to copy; this time may vary, at Paris, from three to thirty minutes.

(To be continued.)

PHOTOGRAPHIC SUMMARY.

BY M. CAREY LEA.

ENGLAND.

Pin-holes.—Major Russel publishes some interesting remarks on this subject which may be epitomized as follows: It is true that the presence of a large quantity of iodide of silver in the baths is the cause of pin-holes, but there is something else at work besides; because,—

1. A perfectly new bath may be thoroughly saturated with iodide of silver, and yet will not give them.

2. An old bath cannot always be cured by adding nitrate of silver, although, by that addition, the relative proportion of iodide present is, of course, decreased, and even largely.

3. Old baths have a tendency to dissolve the iodide out of the film, in some cases, to such a degree that a plate quickly becomes transparent. When the tendency is very marked, it will often be found, Major Russel observes, that the addition of more nitrate of silver and filtering will increase this tendency, instead of diminishing it.

So long as a bath is in its natural condition, there is little tendency to form the iodo-nitrate crystals that produce the pin-holes. The nitrate of silver is in the solution, the iodide in the film, but they do not combine. But when the bath is old and out of order, a great tendency to combination appears. The iodide of silver dissolves out of the film, and combining with the nitrate of silver, is precipitated in those little transparent needles which cause so much annoyance.

Major Russel believes that some decomposition arising from the presence of alcohol in the bath is at the bottom of this tendency, for which, as yet, no satisfactory remedy has been discovered, except the palliative of diluting, filtering, and adding nitrate. And when this is done, the tendency is apt very soon to return. *Notes.*

Old Negatives frequently cease to print well, after a great number of copies have been taken from them, partly because the varnish acquires a yellow tint, and partly because silver is gradually taken up from the silvered paper pressed against them. Mr. England finds that dissolving off the old varnish by means of alcohol, and revarnishing, restores them completely, and that this, with care, may be done without danger. (The method is old, but has generally been thought hazardous, which Mr. England affirms it is not.) *News.*

Drying of the Film.—Sometimes a wet plate may be kept very long; cases of one and a half hours with good results have been known. At other times the film dries irregularly in spots. Where this tendency is very troublesome, it is recommended to use collodion without cadmium salts, and to dilute the silver bath. Wet cloths around the slide are, of course, advantageous. *Ib.*

Dry Plates without Preservatives.—Despratz's method of working with resin has been lately revived. Instead of this, Mr. Bartholomew recommends placing an organic salt in the negative bath which deteriorates rapidly under the influence of the resin collodion. The plates are then (as Mr. Bartholomew's plan, which, however, is not original with him, nor so given) immersed in a bath in which an organic nitrate (for example, nitrate of morphia); $\frac{1}{4}$ gr. to the oz. of bath is quite sufficient. A slight deposit of silver forms on the inside of the bath, but the plates do not fog After sensitizing, the plate is to be simply washed and dried. *Ib.*

GERMANY.

Coloring Positives.—Beyse & Joss have patented a method of coloring positives in the following manner:

The print, as it comes from the frame, is carefully washed, and then, *before toning and fixing*, is laid upon a piece of plate-glass. The excess of moisture is removed by pressing in succession with two or three pieces of soft blotting-paper, and the color is then applied. It is the characteristic of this pro-

cess that the coloring is done before the print is finished, and while it is yet moist. In this way, according to the patentees, the color combines with the albumen, and neither fades by light, nor can be removed by water.

The colors are applied in the liquid form. "Carnation No. 1"* is applied over the whole of the flesh, except the white of the eye, which is carefully avoided. The color soaks in, mingles with the photographic tints, and is modified by them to a yellowish flesh state; then a deeper color is applied where needed. Other objects, if it is desired, dress, carpets, furniture, are appropriately colored in the same way. The print is then gold toned, and fixed with hyposulphite. It is then very carefully washed, neglect of which extreme care leads to fading.

If any further retouching is needed, the print is soaked for a time, and more color, thickened with gum, is applied to the moist albumen. The inventors find a great advantage in working with a solution containing two per cent. of ammonia. [Such a solution may be approximately got by mixing concentrated ammonia (not common liquid ammonia, which is very variable) with fourteen or fifteen times its bulk of water.]

Correspondenz.

OUR PICTURE.

A GREAT many persons think that it is a very easy thing to group and arrange a number of figures and objects, such as are represented in our picture this month, and to photograph them. So it is; but to photograph them *properly* is another thing. Every photographer should have a purpose in what he does, and should make his purpose known in his picture; and every good photographer, who desires to improve and succeed, will study the principles of art.

This picture is from negatives made by Mr. F. A. Wenderoth, some time ago, in order to test the merits of different developers, which experiments were reported before the Philadelphia Photographic Society, and printed in this Journal. Thinking the picture would be a good study for some of our readers, we procured the negatives from Mr. Wenderoth to print from, for the purpose desired. Had they been taken specially for our purpose, they might probably have been somewhat improved; but as they are, they will answer very well as a subject for some remarks that follow. We shall call this picture, "A Study." By posing the figures in such a composition—by arranging the drapery, and placing the other parts, the photographer may study the effect of light and shade, and thus help himself a great deal.

As we said before, these negatives were made to compare the workings of different developers; consequently, the artist selected figures mostly dark in color, and some of them possessing considerable of metallic lustre, in order to observe the effect of the developers more easily.

In photographing such a variety of figures as are shown in the picture, the following should be observed. The higher objects should be placed in the centre, not only to give artistic form, which is very important, but as the focus of our instruments is deepest there, high objects near the edges could not be obtained of proper sharpness. All the objects should be arranged in a slightly curved line, and as near to each other from front to back as possible. Dark-colored objects should have as much light as possible; and light ones should be turned away from the light, or so placed that the shadows of the other objects cover them. Objects with projecting points should be turned as much as possible with their flattest side toward the instrument. Dark and light objects should not be too much mixed, but arranged in groups, so that one brightens the others.

There are many other ways in which a photographer may study besides the one we have described. One way is to study good pictures, that is, all kinds of pictures, photographic and otherwise. Buy specimens of work by better artists than yourself (if you think you are "good enough," we have nothing to say to you), and study them; get access to all the paintings and engravings you can, and study them. If you please, it would improve you very much to practise a little in copying with the pencil, as well as

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* No information is given as to whether this is a solution of ordinary color, or some special preparation.

the camera. Examine yourself, and find out in what particular you are most deficient; then, with a determination to improve, go to work. Thus, *having a purpose*, and *something to attain*, you will find yourself on the road to improvement. To use the words of another, "the manifest presence of intention at once gives vitality to a picture; there is something which appeals to the intellect of the looker-on. It is not merely a piece of delicate manipulation, or wondrously managed light and shade; it is not merely a striking expression, which may mean rage, or may mean despair—the beholder is uncertain which. However simple the subject, if it have a distinct meaning, and that meaning is in the minor objects led up to, as well as in, the principal features of this picture, definitely expressed, it at once acquires a human interest, which the highest phase of technical excellence alone would fail to excite."

This habit of having some object in view when making a photograph is one well worthy of careful cultivation. Every person who enters a photograph gallery for the purpose of being photographed, has his own individual peculiarities of expression, which the photographer must learn to read at once; this he may do by the careful study of expression. He must also learn to decide quickly which will be the best view of the face to take; this is very important, for there is a great difference very often. In the little time you have, study your model quickly. Without being too inquisitive, try to get at his vocation, so that you may not pose a blacksmith or carpenter in the attitude of addressing Congress, or *vice versa*. You have it in your power to alter what is objectionable, and by care you may very often improve the model. Your lens is ready to obey your will, and to produce all that you place within its vision. Get your man in the right pose, see that the figure is well lighted, and go ahead.

Think, think, think! Do not be satisfied with mere mechanical results. By your manner, by your voice, and by the exercise of courtesy and a little humility, endeavor to sympathize with your sitter, and gradually bend him into your purpose, and for the moment influence his mind, so that he will agree with you. We have seen all sorts of sitters, and have had to contend with all sorts of natures in a photograph gallery; but be he gentleman or rough, we generally had our own way, and managed to get it pleasantly in most cases. It would often come about by compromise, by making a picture the way we were requested, and then making one our own way. A photographer must learn "to stoop to conquer." He must give a point rather than quarrel with a customer. Very few persons, who are so directly the servants of the public, are so vexed and tried by the conceits and whims of their patrons. To speak reverently, it takes a great deal of grace to keep amiable sometimes. A few days ago, we were in a neighboring studio, and saw a man who was examining proofs from *three* negatives, which the artist had been good-tempered enough to make for him. Although they were all that could possibly be desired, both as a likeness, and in light, shade, and half tone, the party objected to them as being inferior to a black and white overdone picture that he had taken when several years younger, and when he had fewer wrinkles, and more hair and darker upon his head. We could only give a sigh at the display of such a want of taste, and really envied the amiability of the artist when he offered to sit his ignorant customer again!

Being accustomed to seeing a great many faces every day, we could generally tell when a man or woman entered what kind of a customer was coming, and whether or not we were going to have trouble, and therefore managed accordingly. An operator has to bear insult, hear work that he knows is excellent rudely criticized and condemned, and often be accused of being unaccommodating, and even ungentlemanly; but he will grow hardened in time, tough, and able to bear anything, even crying babies.

You have much to study then, not only in the way of lighting, manipulation, &c., but study faces, and men, and character. Meantime, do not become so conceited yourself that you cannot bear a gentle suggestion, or the least bit of fault-finding. The people of the world are queer, and the most so when in a photograph gallery; and we must all learn to put up with them, and improve both our work and our temper as we go on.

Salad for the Photographer.

The Practical Photographer.—We received a call, a short time ago, from a gentleman who was a stranger to us, but who said he was a professional photographer—a practical man—engaged in the portraiture business on his own account, and that he had called to get an opinion concerning a scientific point about which he wished some information. We cheerfully gave him the instruction he desired; and then, in reply to our question, how his business prospered, he stated that he was not attaining the success he desired—in fact, he had been losing money for some time past, and, "not to put too fine a point upon it," he was becoming discouraged. He did not know why it was. His business position was a good one; his prices were moderate; he thought his work was good; and yet, somehow or other, rivals would carry off the trade. Of course, we expressed our regret at such a state of affairs; but we did not venture to suggest a remedy, as we had no idea ourselves of the cause. However, we accepted an invitation to call and look over his establishment, and a day or two afterward we made the visit. We found his establishment, as he had stated, favorably situated for his business, in one of the great thoroughfares of the city; but the pictures he displayed at the entrance did not impress us very favorably. The lighting of the sitters was not well done. We went in, and as it was late in the afternoon, we found him at leisure, and quite ready to show us all his arrangements. We saw but little to criticize as to his mechanical appliances. The cameras were good, the operating-rooms well arranged, and the advantages for light excellent. It was evident that he did not know how to make proper use of his facilities. We ventured to intimate to him that he could make better use of his light. His skylight was too strong for the eyes of his sitters, and cast heavy shadows on the face. Moreover, he did not modify sufficiently his side lights by a proper disposition of a reflecting screen on the opposite side; and so the contrast was too great between the two sides of his portraits. He acknowledged the justice of our remarks, and promised to put them into practice. As the suggestions we had made were almost self-evident, it occurred to us to ask him what photographic journal he was accustomed to read. "Oh," he replied, "I do not take any." "And why not?" we inquired. "Well," said he, "one-half they contain is lies, and the other half is so wretchedly written one cannot understand it. I have not read any of them for five years." We said nothing further; but we thought, as we bade him adieu, that we knew pretty well why his business was a losing concern. *Br. Jour. of Pho.*

To Remove Blue Frosting.—Those who desire to remove the blue frosting from their glass will find the following very effective: Soft soap, mixed with a solution of potash or caustic soda, or pearlash and slaked lime mixed with sufficient water to form a paste. Either may be laid on with a brush or rag, and when left for some hours will render its removal very easy

Photography Under Ground.—Photographic views by aid of the electric and magnesium lights have recently been made by M. Nadar, of the sewers and other subterranean works of the city of Paris. They are intended to illustrate a book about to be published by engineers and others.

News.

In regard to the use of alcohol for albumen paper, I send you the process as used by Prof. Seely, he being the first to apply the same to albumen paper, as early as 1862: Soak the salted albumen paper in ninety-five per cent. alcohol, in order to coagulate the albumen; then hang up to dry; silver with ammonio-nitrate of silver by any of the known processes. The alcohol should itself be salted if the salting of the albumen is weak. "Vox."

Have you got *Photographic Mosaics* and Newman's Manual? If not, do not be without them.

Editor's Table.

Sad Death of a Photographer.—Mr. C. T. Willard, photographer Eighth and Parrish Sts. Philadelphia, met with a very sad and sudden death on the 10th inst., by falling into the cellar of a new building, which was carelessly left uncovered by the workmen. He struck his head in falling, causing instant death. We enjoyed his personal acquaintance. He was about twenty-eight years old, and leaves a wife and child. He was a young man of unusual amiability, a good friend, and a promising photographer. There are many in the fraternity who will feel his loss sadly. He was the brother of Mr. O. H. Willard, photographer, Chestnut Street.

The prettiest little thing we have seen for some time is a photographic visiting-card from M. E. Mestre Aulet, Havana, Cuba. In the centre of a very neatly embossed card is a single cameo picture in relief, with a handsome ornamented border around it. The raised, cameo appearance and the border are doubtless done with one movement of the press and die. With two half-size tubes, fourteen pictures may be taken on a whole size plate, if the camera be properly arranged. The picture is very pretty, and would doubtless sell here. Thanks to Mr. Mestre.

In publishing his process last month, we overlooked the fact, that Mr. Notman had not sent his collodion receipt. We have since received it, with the following remarks:

"Respecting the formula for collodion, I did not forget it; but we mix, and change so much in our mixtures, that I thought it better not to include it. A bright day requires rather a different mixture from a dull day; also, when we have bridal dresses before the camera, we use a mixture giving more half-tone than would be advisable for darker dresses. I purchase Ponting's bromo-iodized collodion (English make), also Anthony's dry collodion, and use with the following, prepared by ourselves:

Pyroxyline, . .	7 grains.
Alcohol, ...	1 ounce.
Ether, ...	1 "
Iodide of ammonium, .	$4\frac{1}{2}$ grains.
Bromide of ammonium, .	$1\frac{1}{2}$ grains.

I can, by mixing, get the results desired."

Another Testimonial.—We fear our subscribers will get tired of our speaking so much about ourselves; but we know we have a great many friends among them, and believe that they like to hear what others think too. Some of the testimonials we get are too good to be enjoyed by us only; and the following is the latest, which is valuable on account of being different from any others, and which we insert verbatim:

"Lewiston, Me., July 33, 1866.

"I cannot conciencioly subscriibe to a journal which is doing all in its power to humbug its putrons. I certinly think it so with your paper. As a Journal of Photography, I considear it quit wuthless. Yours truly,

C. S. Sanderson.

"Your at libbety to make any use of this cutifcate that will benefit Photoguthus.

"C. S. S."

At the suggestion of our amiable correspondent, we publish his letter for the "benefit of Photoguthus." He subscribed for our Journal six months, and has, we suppose, concluded, that a Webster's spelling-book will do him more good. If he will return his numbers, we will pay him all he paid for them. Two of them are already at a premium, and hard to get.

To counterbalance the above, Prof. Charles F. Himes, Ph. D., of Dickinson College, writes, viz.: "I hope to do something for *The Photographer* the next academic year; at least, all I do shall be for it, for it has become undoubtedly superior in scientific and literary character to anything of its kind at home or abroad."

Another subscriber writes, "I cannot carry on a gallery scientifically without your Journal."

From Mr. W. C. North, Utica, N. Y., we have received a parcel of carte specimens of his work, which are mostly well-lighted, sharp, and good, but rather of a cold tone. Mr. North is "determined to make as good work as the best," which is the spirit all photographers should adopt, and never be content with work "good enough."

Laid Over.—We have received some Carbon prints from Mr. Swan, and some Children's Pictures from Mr. J. Inglis, Montreal. Notices of both are in type, but crowded out until our next, with several other matters.

Wanted.—February and April numbers (1866) of this Journal. 75 cents each paid for them.

"The Bromide Patent—Beware of Humbug."

[We have received the following, too late for insertion in proper place.—Ed.]

Messrs. Benerman & Wilson: In the last number of *The Photographer*, a St. Louis correspondent ventilates (?) the "bromide patent" for the *benefit*, as he *says*, of photographers, and warns them to "beware of humbug," &c. The gross misrepresentations of your correspondent lead me to notice his communication with a few brief comments, which I desire you to publish. You have opened the columns of your Journal to the foes of the patent, and will not, I hope, close them against its friends. The article in your last number to which I allude purports to come from "*Cramer & Gross*," and states, among other things, that the "bromide patent was printed in a complete process of making a certain kind of ambrotypes," &c. If photographers will but read the letters-patent, they will at once discover the absurdity of such a statement. The patent, and the invention thereby secured, is for the use of a "bromo-iodized collodion" for photographic purposes. Every invention consists in something. In the sewing-machine, it is a certain combination of machinery to make the needle produce certain results; in the "bromide patent," it is the use in collodion of "bromine" in the form of a "bromide." The making of the sewing-machine may be described in the patent as made of steel; but if platinum be used, would it be any the less an infringement, so long as the combination was made to work the needle in substantially the same way? Your correspondent asserts, that the "bromides of cadmium, ammonium, zinc, &c., are just as much different in their substance from bromide of potassium as chloride of gold from chloride of sodium."

To a photographic chemist, this assertion to defeat the patent must seem amusing. Does not the union of bromine with these salts produce a bromide, just as much as does the union of potassium? In collodion for photographic purposes, is not one bromide the equivalent of another? or, in other words, does not each of the bromides in collodion for photographic purposes produce substantially the same result in substantially the same way?

Suppose, however, that one operates better than another. It must be admitted that the bromides are used to accomplish a certain effect. Now, one bromide may or may not have an advantage over another; either way, it cannot affect the validity of the patent. It is a bromide still, and used to accomplish the same purpose, though one may do it better than another.

In the case of "Goodyear *v.* the Railroads, vol. 2 of Wall, Jr.'s Reports, p. 361," the court says, as follows, to wit: "No person can take the benefit of a patentee's discovery for the production of a new manufacture, and, by *varying* or improving the mode or process of its production, rob the patentee of his franchise." In the case of "Winans *v.* Denmead, 15th of Hen. Report, p. 342," the court says, as follows, to wit: "It is a familiar rule, that to copy the *principle* or *mode* of operation described in a patent is an infringement, although such copy should be totally unlike the original in form and proportions." In the case of "Blanchard *v.* Beers, 2d Blatch. Report, p. 418," the court say, as follows, to wit: "No person can appropriate the benefit of the new ideas which another has originated, and put into practical use, because he may have been enabled by superior skill to embody them in a form different in appearance, and different in reality. Although he may *not* have preserved the exterior appearance of the previous machine, he may have appropriated the *ideas* which give to it all its value." In the case of "Alden *v.* Dewey, 1 Story's Report, p. 339," the court say, as follows, to wit: "It is not necessary that two things should be identical in order to make one an infringement of the other. The true question is, are they substantially the same, though not in every minute particular."

Now, will your correspondent favor us with a single decision by the courts against the doctrine laid down in the cases I have cited? I challenge *any one* to do so. Your correspondent would have photographers believe that he is conversant with the principles of patent laws; if he is, he *knows* that if I was not entirely satisfied that the patent embraced the equivalent, I could and should surrender it, and obtain a reissue. In the case of "Ames *v.* Howard, 1 Sumn's Report, p. 488," the court say, as follows, to wit: "Whoever erects or uses a patented machine does so at his peril. He takes upon himself all the chances of the patent's being originally valid, or being afterward made so by a surrender, and the grant of a new one." Mr. Cutting's original application for this patent was pending for months before the examiners at Washington prior to the granting of the patent, the examiners at first taking the ground, that the use of bromides for photographic

purposes was not new; and a kind of a trial was had upon this question at that time, in which Mr. Cutting admitted that the bromides had been used before for photographic purposes, but *claimed* that they had never been before his discovery used in combination with collodion, and upon the proof of this fact the patent was granted. If your correspondent will examine the correspondence between Mr. Cutting and the Department, pending the application, he will find that in his last letter, dated June 21, 1854, Mr. Cutting uses the following language, to wit: "To whatever my success may be due, I maintain that I have been the *first* to use *bromide bases with collodion*, and with that only do I claim it." I will not at this time take more space upon the doctrine of equivalents.

Your correspondent asserts, that he has formulæ for a bromo-iodized collodion, published in France, in 1851. I wrote to "Cramer & Gross" the first of this month, offering to refer to the judge in their circuit a case against them for infringement, upon the evidence they claim to have, and the evidence I can produce, since which time I have heard nothing from them. The *fact* is, they have no such publication as the law requires to defeat letters-patent. All the publications alluded to by letter-writers thus far were produced in the Frederick's case, and availed nothing against the patent. The letters-patent protect Mr. Cutting from the date of his *discovery*. In the case of "Mellues *v.* Silesbee, 4 Moss's Report, p. 111," the court say as follows, to wit: "Construing section 1 by section 6 of the act of 1793, the true meaning is, that the first inventor has a right to a patent, though there may have been a knowledge and use of the thing invented by others before his application for a patent, if such knowledge and use was not anterior to his *discovery*."

In the case of "Matthews *v.* Scates, Laws' Digest, p. 444, sec. 26," the court say, as follows, to wit: "Though others may have had similar ideas, and may have experimented upon them, the person who first *perfected* the idea, and made it capable of practical use, is the inventor, and entitled to a patent."

I cannot feel that I need say any more upon this point; it has undergone legal investigation, and been settled in my favor. The effect of the bromides in collodion for photographic purposes did not become known without experiment and investigation. Who was the first to make it successful? If Mr. Cutting is not the man, who is?

As your correspondent warns photographers to "beware of humbug," I, in turn, take the same liberty, and will add, that to characterize letters-patent of the United States as humbugs is not a light offence, especially after they have been sustained in the courts.

To make out a case against any photographer, I have only to produce the letters-patent—my title thereto—and prove an infringement. The case is thus won in favor unless a defence can invalidate it, and until this is done the patent is no humbug; the law presumes it to be good. Is it not then an outrage upon intelligence for men to stigmatise a patent as a humbug which the law compels us to respect, as much as it compels us to respect the rights of another to his pocketbook?

I am determined to vindicate my rights in this matter, and photographers will, of course, take such a position as they choose.

Your Journal, Messrs. Editors, is not the place in which to try the validity of my patent; but I could not resist the impulse to thus briefly notice the communication from St. Louis. In a few weeks they will have ample opportunity to present any defence they can make to the proper tribunal. Meantime, I shall assert my rights, and enforce the same to the letter, feeling that the course taken by photographers leaves me no opportunity to be longer lenient.

Truly, &c.,

T. H. Hubbard,

General Assignee Bromide Patent.

THE

Philadelphia Photographer.

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Durability of Albumen and of Developed Prints.

BY M. CAREY LEA.

I HAVE made a long and minute examination of the resisting powers of albumen prints to the destructive effects of oxidizing agencies. I attach more importance to oxidizing agencies of destruction than to reducing ones, for the reason that they are those most generally at work in atmospheric effect, and also because this general rule seems to be correctly applicable to silver prints. This, I think, is a fair inference from the fact that prints hung up in the light keep better than those shut up in albums and portfolios. The specific agency of light, especially upon silver compounds, is a reducing one. The preservative effect of an exposure to light would seem to act by counteracting the oxidizing tendencies of the atmosphere.

It is certainly true that the air has, as a general thing, little tendency to oxidize silver; but *ozone* has. To the minute portions of ozone disseminated in the atmosphere must, I think, be attributed whatever powers of oxidation that atmosphere is capable of exhibiting toward silver and silver prints.

If this view of the case be correct, ozone is itself the most important of oxidizing influences which should be examined in its relations to prints, and accordingly it has received a large share in the present investigation.

For a second subject of comparison, I selected nitric acid in very dilute form. Whatever injury was suffered by it seemed no very unfair criterion as to their general permanence, because it not only measured their resistance to oxidation, but also the stability of the form in which the metals were present, and, perhaps, the relative preponderance of the gold over the silver.

I have now before me one hundred and thirty-six registered specimens, and which, I think, enable me to speak with some certainty so far as my investigation went. I do not doubt, however, that the examination might be advantageously extended to the other destructive agencies which beset our photographic productions.

In some respects, these trials gave results very unexpected to me, and quite contrary to received opinions. I refer especially to the fact, that they seemed to indicate a greater permanency for prints toned in a toning and fixing bath of hyposulphite and gold than for those in which the toning and fixing was done separately. I am not prepared to assume the position of an advocate of this method. Fine tones are obtained with it, but with much less certainty than with the newer tonings. It is to be remembered that the specimens examined by me were toned and fixed in a fresh bath in per-

fectly good order, and are to be taken as *relating solely to such.* When the use of such a bath is continued too long, the gold becomes exhausted, the hyposulphite decomposed, and the bath degenerated into a mere sulphur-toner, owing its activity to the presence of tetrathionate of soda. The utter instability of such toning is well known, and is strongly exemplified in the following experiments.

Another point which these experiments bring prominently forward is the *extreme weakness of developed prints.* These prints have usually been thought to be exceptionally strong. It has been often affirmed that they contain much more metal than sun prints, and resist decomposing agencies far more effectually. In the interval since I became, by these experiments, convinced of the contrary, I observe that Mr. Sutton, one of the most enthusiastic advocates of the development printing, has frankly abandoned his former views, and acknowledged his error. This result is perfectly in harmony with the conclusions that I had already come to, and here publish, much later than I intended, for want of time to sooner write them out.

SERIES 1.

In this series five tonings were experimented upon:

A. Washed after printing; then toned with benzoate of gold; then fixed in hypo and washed.

B. Same, except that the citric acid toning bath was used.

C. Tetrathionate toning; hyposulphite of soda treated with chloride of lead.

D. Hyposulphite and gold toning.

E. *C* and *D* mixed.

To render the effects of the after treatment more conspicuous, the printing was very lightly done. The print was cut up, and portions were carefully toned in each of the above baths.

Then these portions, all carefully registered, were cut up, and a portion of each subjected to each of the following treatments:

1. Exposed *dry* to the action of ozone, under a bell-glass, for forty hours.

2. Exposed to same treatment, *wet.*

3. Exposed to the action of nitric acid, sp. gr. 1.28, diluted to $\frac{1}{25}$ with water, for seventeen hours.

4. Same, for thirty hours.

5. Same, for one hundred hours.

These twenty-five results were then carefully compared, as follows:

α. The action of the ozone was in every case more powerful on the dry papers than the wet.

β. After the print had been exposed to the nitric solution for seventeen hours, little further result followed in the following thirteen; but when the time was extended to one hundred hours, the original effect was about doubled.

γ. Of *A* (benzoate), *B* (citrate), and *D* (hypo and gold) tonings, the latter, in place of being the weaker, resisted a little the best.

δ. *C*, the sulphur toning, resisted miserably, and was almost effaced; and when it was mixed with the hypo and gold (*E*), the resisting power of the latter toning was also destroyed.

This last mixed bath may be correctly taken as representing the condition of a hypo and gold bath which has been in use too long; for the chloride of silver in the print, in being removed by dissolution in the hyposulphite, decomposes the latter, just as does the chloride of lead in *C*, so that this set of trials clearly shows the strength and the weakness of the hypo and gold bath—the strength which it gives to pictures when new and fresh, and the weakness which it leaves when used after the hypo is decomposed *even although* (as in case *E*) *there be abundance of gold present*, and even if *fresh hypo* (as in *E*) *has been just added.*

I may also remark, that a piece of sensitive paper, blackened by plunging into a solution of hydrosulphate of ammonia, was not perceptibly altered or lightened in color by remaining in the nitric acid solution for a hundred and twenty hours.

This experiment seems to show that sulphide of silver, even when in thin strata, and formed in an albumen film, is not easily oxidized by weak nitric acid. In fact, a dense deposit of sulphide of silver is a tolerably permanent thing, as also shown by the

permanence of negatives blackened with alkaline sulphide.

F. Was toned as an exception, *without washing,* in alkaline chloride. It is not necessary to say anything of this than that the *resisting power of the print* seemed to be equal to that of another piece in which the usual washing was given; but the lights suffered, and when exposed to the action of ozone, they turned much darker than in a corresponding piece which had been properly washed. The same result took place under the action of nitric acid.

SERIES 2.

The following were all sensitized in a forty-grain bath of plain nitrate of silver, and were fumed for five minutes with ammonia. From a large negative several prints were made, with equal exposures, on a day of equable light. These were cut up, and furnished the material for the following trials. In every case, a portion of the original was marked, registered, and preserved for reference, all of which specimens are now before me:

G. Toned and fixed in water, eight ounces; hyposulphite, two ounces; chloride of gold, equivalent to one grain of metallic gold; mixed hot, and used two or three hours after mixing. This toned to a rich purple, without any coppery shade.

Exposed to the action of ozone for sixty hours, the whites became a little discolored. The picture scarcely lost anything of its strength, though its tone became slightly warmer.

A standard dilute solution of nitric acid, containing one part of nitric acid, sp. gr. 1.28, to twenty-four of water, produced no visible diminution of strength, by careful comparison, after an action of five days. This resistance is remarkable, and well worthy of observation.

H. Lime toning. Ozone for sixty hours changed the tone to dingy purple, and discolored the lights very much.

Dilute nitric acid weakened the picture a good deal; discolored the lights a little.

I. Alkaline chloride; effects about the same as the last.

J. Benzoate of gold toning.
K. Citrate of gold-toning.

The behavior of these two was very similar; and the resistance in both cases seemed rather better than with *H* and *I* to both ozone and nitric acid.

SERIES 3.

Printed on ammonio-nitrate paper sensitized in a fifty-grain bath. Same precautions taken as before, and work executed on same day as Series 2, so that the results are comparable with that series, as well as with each other.

M. Benzoate of gold toning. Not sensibly different from *J.*

N. Lime toning. The strength in this case was somewhat lowered in the toning, and the resistance was diminished proportionately.

O. Alkaline chloride. About as with *I.*

P. Citrate of gold. Same as *M*, and a little better than *N* and *O.*

Q. Same toning as *G*, and same result. These two were strikingly superior in resistance to all the rest.

From Series 2 and 3, the following conclusions are to be drawn:

1. That, in resistance to the action of the agents used, there is scarcely any visible difference between ammonio-nitrate paper and fumed paper; but what difference there is, is in favor of the fumed.

2. That citrate and benzoate of gold tonings are about equal, and that both show a little better resisting power than alkaline chloride and lime toning, and which last two are, as compared with each other, about equal.

3. That prints toned in a fresh bath of hyposulphite and gold, show a marked superiority to any of those fixed and toned separately in resisting power.

SERIES 4.

The object of this series was to compare the influence of alkaline sulphocyanide upon the strength of the picture when used as a fixing agent.

T. Toned with alkaline chloride, and fixed with hyposulphite.

W. Same, but fixed with a solution of sulphocyanide of potassium, one sulphocyanide to five water.

X. Toned and fixed with hypo and gold; same bath as *G*, but four days old.

Z. Toned and fixed in a bath of sulphocyanide, containing fulminating gold in solution.

Without reviewing these cases specially, it is sufficient to say, that the pictures fixed by sulphocyanide seemed to have equal permanence (so far as a single trial could indicate) as those treated with hypo. In some cases, details seemed to be preserved in the fixing which were not apparent in those fixed with hyposulphite. The sulphocyanide was not examined as to its fixing powers, that not coming within the scope of this examination.

Series 5.

The object of this series was to compare the strength of prints produced by the *positive development process* with the foregoing.

AA. Toned and fixed in a bath of sulphocyanide of potassium and chloride of gold, one day old; resistance to ozone and to nitric acid excellent.

BB. Toned and fixed in a bath of sulphocyanide and fulminating gold, one day old; resistance excellent, but a reddish discoloration of the white.

CC. Toned and fixed in hyposulphite of soda and chloride of gold, five days old; toned to a warm black; resistance excellent.

DD. Same, but left in the toning and fixing bath for *five hours*. This protracted exposure to hyposulphite made no difference either in the tone or the resisting power.

EE. Developed with gallic acid on plain paper, and *not toned*. The color of this print was a fine sepia brown; but, under the action of the agents above described, *it almost completely vanished*. The residue of color left behind might be roughly estimated at five per cent., so that ninety-five per cent. of the strength was gone.

FF. Developed with gallic acid, and toned with alkaline chloride to a warm black; resisted a little better than the last, but failed miserably in comparison with all the sun prints.

GG. Developed on plain paper with gallic acid, and sulphur toned. (See *C*, Series 1.) Here the resistance was not so good as with the gold-toned developed print (*FF*), but better than with the simply developed print (*EE*).

But all these developed prints, whether left as developed, or toned afterward, were such utter failures, as far as resistance to oxidizing agencies are concerned, as to show that this method of printing is entirely to be condemned, and ought never to be resorted to except when sun-printing is inapplicable. When we consider the amount of praise which has been, by some authors, bestowed on this method of printing in this very respect of permanency, and the utter absence of foundation on which such extemporized opinions have rested, we are led to regret that more care is not taken before pronouncing on questions which require only patience and experiment to answer correctly.

A further series of a considerable number of trials was made, in which specimens similar to the foregoing were exposed to the action of the same dilute nitric acid over a space of two weeks.

It seems needless to repeat in detail all these results; it seems sufficient to say, that they entirely agreed with the previous experiments already described.

Conclusions.

In describing the results given of many scores of trials, it is difficult, in the separate descriptions, to give the generalizations obtained from a careful comparative scrutiny of the whole series. I, therefore, collect below the following conclusions:

1. Albumenized prints, after toning, should remain in the fixing-bath from twenty to twenty-five minutes. Those which were fixed in ten to twelve minutes turned yellow in the whites when exposed to the action of ozone, plainly indicating that the action of the hyposulphite had not been carried far enough.

[The action of ozone upon prints is always very instructive, inasmuch as it seems not improbable that the oxidizing effect of the atmosphere is more or less due to the presence of this agent in it, and proportionate to the quantity present.]

2. The turning yellow of prints by ozone (and probably by atmospheric air) seems to depend on other causes as well as the presence of silver; that is, in a thoroughly fixed

print, ozone will often (perhaps always) not cause a yellowing of the whites, although traces of silver may be detected by hydrosulphate of ammonia; but imperfect fixing (see 1) always leads to yellowing by ozone.

3. The received opinion of the necessity of thorough washing before toning (in the case of separate fixing and toning) is correct. A contrary course is very injurious to the whites.

4. A thoroughly well-printed, toned, and fixed print (toned to black, or nearly), is not injured or faded by a very prolonged exposure to the action of dilute nitric acid of the strength used in these trials, viz., 4 per cent. of pure acid, sp. gr. 1.28.

5. Ozone acts more energetically. The specimens which, in all cases, best resisted its action were those that were fixed and toned at one operation, either by hyposulphite and gold, or sulphocyanide and gold.

6. Whatever difference exists in permanence between fumed prints and those on ammonio-nitrate paper, not fumed, is, if any, in favor of the fuming.

7. Developed prints are greatly inferior in resisting power to any sort of properly-made sun-prints toned in any of the foregoing manners. Developed prints toned with gold are strengthened thereby, not weakened, as thought by Hardwich. Both these facts are contrary to received opinions, but are too certainly true to admit of a doubt.

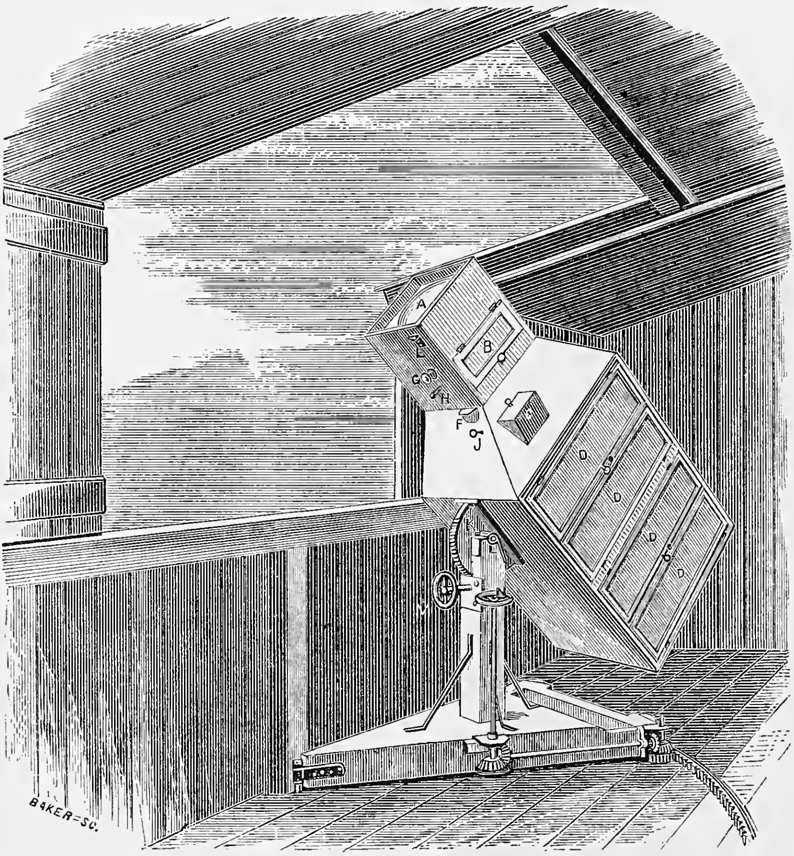
8. Prints toned and fixed at a single operation give the greatest prospect of permanence, when the bath is fresh, and the whole operation is properly performed; but when the bath used contains decomposed hyposulphite in any quantity (and the proportion present, it must be remembered, augments with every print immersed), the resulting picture is the weakest of all sun-prints, and almost as weak as a developed print. This is the case even if gold be *abundantly* added. No quantity of gold will cure the weakness of such a bath, which depends upon the presence of tetrathionate of soda, arising from the decomposition of the hyposulphite by silver salts in the print; nor will the *addition of fresh hyposulphite cure such a bath.* I have satisfied myself that a fixing and toning bath, in perfect order, may be spoiled by the simple addition of a little chloride of lead, which, like the chloride of silver and nitrate of silver, has the property of giving rise to the production of tetrathionate of soda.

It is, therefore, by no means with the intention of recommending this bath that I place these facts upon record, but only with a view of having all these operations set on their true basis. To affirm that a print fixed and toned together is necessarily weak, is as great an absurdity as to affirm that a developed print is stronger than a sun-print; and yet this has been done very widely, and by many is doubtless yet believed. But to adopt a system of toning and fixing which, whilst it commences right, rapidly deteriorates, without the power of the operator to discriminate at what point it ceases to be fit for use, would be a yet more serious mistake.

A NEW DESIGN FOR A SOLAR CAMERA.

As the method of producing large photographs by the aid of the solar camera is becoming more and more in vogue, both in this country and in Europe, I venture to send you a description and drawing of one I have designed and built, together with the room it occupies, to suit my own special wants. Before proceeding with its description, I would say, that after a lengthened trial in making portraits up to sixteen by twenty, both by negatives taken that size *in* the camera, and from small negatives by the solar camera, I was convinced that, with careful manipulation in producing the right kind of solar negatives, pictures by the latter instrument could be made fully equal to those made from contact negatives; and the only drawback *I* found was the necessary aid of King Sol when you want him, and a direct, or other solar printing camera, in which the mechanical working parts work sufficiently accurate to enable you to obtain the desired results in the photograph. At that time (1863), the only direct printing solar camera to be had was Shive's; and after a trial of it, I did not consider it perfect enough in its parts for the purpose desired. Just then (November, 1863), there appeared in the columns of "The Photographic News" a description of a solar

camera by J. Stuart, of Glasgow, which, by uniting the room with the solar camera, struck me as being very practicable, and my first model was constructed on his plan; but owing to the exposed position of the roof of the building on which I intended to erect it, and fearing in winter it would be rendered useless by the base becoming clogged up with ice and snow, I abandoned that plan, and, after various modifications, adopted the following, which, after six months' trial, has proved to be all I could desire.



The room in which the camera is kept and worked stands east and west, and is eighteen feet long by thirteen feet wide, nine feet high on the north side, with roof sloping down to seven feet on the south side. In the roof is an opening six feet square, provided with a light wooden shutter, sliding in grooves, and raised to the position seen in the drawing by a cord passing over a pulley, made fast at the north side of the room. An opening, three by six feet, is made on the south side for use during the winter months, and provided with sliding shutters. The drawing represents the same open, and the camera in position for printing. In the solar cameras of Shive and Roettger, the centre of motion is under the body of the camera, necessitating a wide open space to work the instrument. In this, it will be seen that, when the camera is brought to a horizontal position, the centre of motion from east to west is under the condensing lens, enabling the lens to receive the light and follow the course of the sun from nine to three o'clock, in a space the square of the length of the camera, which is six feet six inches, over all. The body of the

camera is made in panels, well framed together on a bottom of one and a half inch boards. Its interior dimensions are twenty-six by thirty-two inches, by five feet, and the front portion, holding lens, &c., eighteen inches. A is the condensing lens; B the door to admit the frame holding the negative; C is a small door through which to inspect the progress of printing; D D D D doors opening to admit the printing-board, which slides in grooves placed at the top and bottom of the camera; E is a piece of metal, with small holes, through which a pencil of light falls on the projection, F, as a guide to keep the sun on the centre of the lens; G is the focussing screw; H is the binding screw; and J is attached to a wooden armature, carrying a light frame covered with tissue-paper, which, by pulling the wire, is brought down in front of the enlarging lens, to allow of the print being examined, and drawn back by a strong elastic ring. K is a section of about three-fourths of a circle of twelve inches in diameter, having on its edge a flat piece, five by twelve inches, cast in one piece, with holes for bolts to attach it to the body of the camera. Its centre is square for an axle resting in the journal, L, one side of which tends downward, at an angle of seventy degrees. The edge of K is cogged to work in the endless screw, M, by which the camera is kept to the sun's elevation. The post on which it is supported is five and a half inches square, mortised into a two-inch plank attached to the triangle frame of two by three inch stuff. The post being further supported by iron braces, the point of the triangle base has a hinge-like coupling to the post in the side of the room. N is the rod connecting the bevelled cog-wheels, by turning which the camera is moved from east to west, and *vice versa.*

Screwed fast to the floor is a circular iron track, having its upper edge half round, and cogged inside. The point of the triangle base forms the centre of the circle. At the broad end of the base is attached two grooved-edge wheels, and resting on the track, allowing a free and steady motion to the camera. The condensing lens is thirteen inches diameter, and sixteen inches focal length. The arrangement of this and the enlarging lenses (both made to order by Herman Roettger, Philadelphia), enables me to make a life-size head from a one-inch head negative, within a distance of five feet from the enlarging lens.

The room, also, makes an excellent one for copying in, being able to get the sun on a copy at any hour of the day. The north side of the room is arranged for stereoscopic printing in diffused light, and the prints so printed are far superior. In case prints, on canvas or paper, by development, are wanted, the room can be entirely closed from white light, and yellow light admitted with but a moment's delay.

J. CARBUTT.

CHICAGO, September, 1866.

"FADING OF OPAL PICTURES."

EDITOR PHILADELPHIA PHOTOGRAPHER:

In the August number of *The Photographer*, page 232, appeared an article under the head of "Fading of Opal Pictures." The names of two different parties, of well-known celebrity in the photographic art, being connected therewith, causes one to inquire into the merits of the subject under consideration. I would, therefore, offer a few thoughts upon the "Fading of Opal Pictures," not for any value that they may be entitled to, but for the express purpose of keeping the subject before the fraternity until the *fact of the permanency or the fading of the opalotype may become fully established.* In view of that object, allow me to explain my position as connected with the opal picture. It has been a little less than one year since I first produced opal pictures by contact printing, previous to which I depended upon the "wet process" (and, by the bye, some of those results were excellent). I have some two or three of my first now in my possession, and am free to say that there is but one, out of some two dozen printed within the year, that shows any signs of fading. During the whole summer, one of my very first efforts (together with others made later) has been in our show-case at the door, where the sun has had a "fair shake" at it three hours per day (almost enough heat and light, in connection with

lack of air, to draw the color out of a man), and still no signs of fading; nor do I see any *good reason* for their fading. The substance left upon the plate after the print is toned and washed is no more than that upon the negative or ambrotype plate. While one is the product of iodide of silver, the other is the product of chloride of silver. The vehicle used to carry them along is the same in both instances. If it is necessary to wash the opalotype thirty minutes, it is also necessary to wash the negative or ambrotype thirty minutes, especially where both are fixed in hyposulphite of soda. The use of albumen under the collodion is no new experiment. There are many operators who flow albumen upon their glass before flowing with collodion in making negatives. The only object in using the albumen is to secure more *body or depth* to the opal print. There is no doubt about good opal pictures being produced with the collodion alone, but not with the same proportion of ingredients as are used when the plates are albumenized. The only instance within my knowledge of an opal picture fading is one of those mentioned as having been, during these long *summer days*, in the show-case at the door; and yet really nothing has faded on that plate *except it be the color of it*. The sepia has turned to a yellowish-brown. It was printed with a weak negative, being undertimed, toned, fixed, and washed (sufficient to account for its erratic habits).

Chloride of strontium, citric acid, ether, alcohol, and pyroxiline, are the only chemicals used in my process. The plates are previously flowed with albumen and water, equal parts. The prints are toned in an old gold bath, and fixed in hyposulphite of soda. In regard to "blisters," and "the separating of the film from the plate," I must say that I have not seen the first cause of alarm in that direction. I have not, in any instance, "treated the edges with lac-varnish, solution of wax, or benzole" (it is well that we understand what to use, as a preventive, when we are so troubled). The article referred to calls upon the fraternity for information upon the subject of "Fading of Opal Pictures;" and that I may have a right to reiterate that call, I have spoken as it "seemeth right" that I should speak. Hoping to hear from others, and that you will give us all the information you are or may be possessed of, I will close by subscribing myself,

Yours truly,

J. B. Webster.

Louisville, Ky.

[Mr. Webster's testimony is very acceptable, and we hope we shall be favored with the experience of some others in this direction. These beautiful pictures must not be condemned without cause. Let us hear from you.—Ed.]

PAPER TURNING YELLOW.

Editor Philadelphia Photographer:

In the August number of *The Photographer*, page 253, you give, under the head of "Paper Turning Yellow," some hints, and various precautions, to be observed to prevent the same. As the article does not state or explain the cause of the "*turning*," the remedy is only partial, and many times of no avail. Having prepared my own albumen-paper ever since it was first used in the art, I was for a long time troubled with it turning yellow, measles striking through to the back of the paper, and all the category of calamities incident thereto. Various and numberless were the expedients resorted to to dislodge this enemy from his position; but all my endeavors were of only partial avail. At last, however, I became convinced that the yellow stains were caused by fermented acid in the albumen used; but I found Mr. Acid so strongly intrenched in his stronghold that I was unsuccessful in my attempts to rout him by any direct attack. As a last resort, I concluded to flank him, "*a la* Grant," and take him in the rear. For that purpose, I prepared a solution, as follows:

Water, ...	20 ounces.
Sal soda (washing soda),	60 grains.
Chloride of ammonium,	120 "

I floated the paper, *back down*, on this solution five minutes, or until the paper laid flat, and the albumen surface became moist and soft. I then hung it up to dry, after which it was silvered, fumed, printed, and toned as usual. In that way, the sal. soda

neutralized the acid, and the paper would keep some days very white, unless it was very hot. There is some work in this, but a good return is made in the quality of the prints and the paper saved. Of course, it is necessary to use some care, and not to allow the neutralizing solution to come in contact with the albumen, as it immediately washes it off. If the paper is already heavily salted, the ammonium can be omitted from the neutralizing solution. All albumen-paper before silvering should be smartly rubbed on the albumen face with a clean piece of cotton flannel. The flannel will absorb and convey away a thin film of animal oil, which deters the silver from taking readily. Any of your subscribers who are troubled with the yellows, by adopting this "dodge," will very soon discover the fact that their old enemy is really dead and buried.

After fourteen years' successful practice in my old gallery, I have just moved into a new one. I occupy one entire floor, forty-two by seventy-two feet. My skylight-room is twenty-eight feet square. I can operate on three sides of the light, east, south, and west, and I get a fine light at all hours, rain or shine. Several "well-posted" photographers, who have seen it, have expressed the conviction that I have made a strike, not exactly in oil, but in light. My own opinion is, that it is not excelled. I can give you a description, and perhaps a drawing of it, if desirable. The cause of the paper turning yellow is fermented acid. Lest any one should fall into error in regard to the soda, I would say that the amount given in my formula is not to be taken as the amount that is best at all times, and with all papers. The amount of fermented acid is very different in different samples of paper. Sometimes one grain of soda to the ounce of water is enough to prevent the yellowing; sometimes five or eight is none too much. Enough to neutralize the acid is necessary. I have been using, for a long time, a sample of paper that required only three grains of soda to each ounce of water. To-day I am getting some choice results with another sample, using a twelve-grain solution.

This filling the pores of the paper back of the albumen, with carbonate of soda, which, after silvering, is rendered more or less into carbonate of silver, gives pictures of great depth, which, when properly toned, never sink in the hypo bath. There is enough alkaline when twelve grains are used; so that if the gold is nearly neutral, there is no need of using any alkaline in the toning bath, and the bath decomposes less rapidly than is usual. Less fuming is necessary for obvious reasons, and the ammonia for fuming may be reduced largely with water. I use silver, with a fifty-grain solution, from three-quarters to one and a half minutes, according to the thickness of paper. I use a mixed solution of plain and ammonio-nitrate of silver,—one part ammonio-nitrate to four of plain.

Nearly all plain papers are sized with sizing containing more or less fermented acid. The same treatment will prove beneficial in keeping the lights pure while printing. A knowledge of the course and remedy for paper turning yellow, is of great importance to the practical photographer, as it gives him control of his printing, and is a means of getting very much better effects.

You may hear from me again, now I am getting settled.

F. B. Gage.

St. Johnsbury, Vt.

[Mr. Gage is well known to many of our readers, and his papers are always fresh, valuable, and welcome to our pages.—Ed.]

SEXTON'S PORCELAIN PRINTING FRAME.

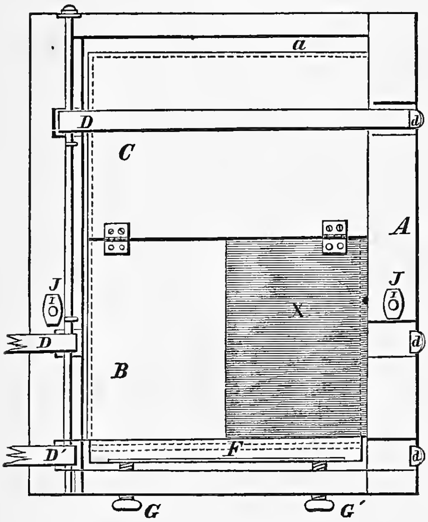
There have been a great many devices for porcelain printing-frames since the beautiful and popular pictures on porcelain glass came into fashion, all of which have been possessed of some merit, but none being perfect. Mr. T. E. Sexton, of Wilmington, Del., being a practical photographer, and knowing what was most needed, has patented a frame, which, he thinks, covers all the requirements, and which he describes in his letters-patent, as follows:

"A is an oblong wooden frame, at the inner edge of which is a ledge or projection, *a*, and on the latter rests the usual glass negative plate, B.

"On the glass plate, B, within the frame,

rest the usual boards, C′, hinged together, and padded on their under sides; and one of

Fig. 1

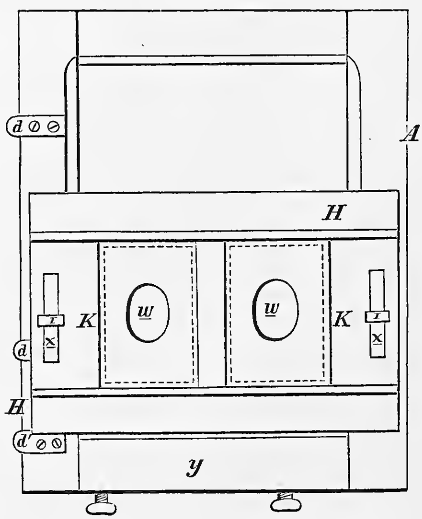


which is removed from the hinges in the cut; to the frame are hinged two spring-plates, D D, each of which is retained in contact with the upper surface of one of the boards, by a spring-catch, *d*, secured to the side of the frame. On the plate, B, between one edge of the board, and the side, *y* (Fig. 2), of the frame, rests a wooden strip, F, against the upper side of which bears a spring-plate, D′, the latter being hinged to the frame at one end, and confined at the opposite end by a spring-catch, *d′*, but broken off in the cut in order to show the parts more plainly.

"In the side, *y*, of the frame, turn two set screws, G G′, the ends of which bear against the side of the strip, F. Through slots, *x x* (Fig. 2), in a metal plate, H, at the under side of the frame, A, pass bolts, I I, the heads of which being brought against the plate by thumb-nuts, J J, which screw on to the opposite ends of the bolts, and bear on the adjacent side of the frame. The heads of the bolts are so formed, that when turned in one direction, they can be passed through the slots, *x x*. The opposite edges of the plate, H, are turned down, and the edge of each of these turned-down portions, is bent so as to form a channel for the reception of one edge of a ground-glass plate. In the plate, H, are two openings (indicated by dotted lines, Fig. 2), which are covered by cards, K K′, the latter being confined at the ends, between the turned-down portions and the body of the plate; and in each card is an oval opening, *u*, for a purpose described hereafter.

"A colored glass or porcelain plate, X, on which a photograph is to be printed, is placed with its prepared side against the negative plate, B, one side edge being brought against the inner edge of the frame, and the lower edge bearing against the strip, F, the plate, X, being of such a size as to cover the design on the negative plate.

Fig 2



"If it should be found that the edges of the plate, X, are not at right-angles to each other, the set screws, G G′, are turned until the edge of the strip, F, touches that of the plate at all points, as shown in Fig. 2. The spring-plate, D′, is then turned down, and secured by the catch, *d′*, the strip, F, and negative plate, B, being thus firmly held in their places. The hinged boards, are then introduced into the frame, one board bearing on the plate, X; and the springs, D D, are turned down and secured by the catches, *d d*, the springs bearing on the boards, and confining them and the plate, X, securely in their positions.

"If it is desirable to print a vignette pic-

ture, the plate, H, and the card, K′, are so adjusted that the light may only fall on that part of the plate containing the portion of the design to be printed. The ground-glass, is then brought above the card, K′, and the frame is exposed to the sun in the usual manner.

"When the operator wishes to ascertain the condition of the print, he draws back the spring-catch, *d*, so as to release the spring, D, above the board, which covers the porcelain plate; the latter is then turned back, and the plate, X, is removed, and the print examined.

"Should it be necessary to again expose the plate to the light, it is placed on the plate, B, as before, care being taken to bring the edges of the plate closely against those of the frame and strip, F. The board is then turned down and secured by the spring-plate, D, and the plate is exposed to the sun, as before.

"It is extremely difficult, with the frames at present used, to print a distinct picture on a rigid plate, as it is impossible to always return the plate after examination to the exact position it previously occupied; and when it is endeavored to overcome this difficulty by avoiding any removal of the plate, and relying on the judgment of the operator to determine the proper length of time to expose the same, the picture is very apt to be either too dark or too light in color. I have ascertained, from many practical experiments, that by means of the above described frame the plate may be examined as often as necessary, and after examination can invariably be returned to the exact position it previously occupied, and that a print of the exact depth of color required may thus be produced without detracting in the least from the sharpness of the outline.

"It will be apparent that two adjustable strips, F, may be used, one near each end of the frame, or that they may be placed at the sides of the frame.

"By the use of the spring-plates, D, and catches, *d*, the ordinary clumsy and inefficient buttons and set screws are dispensed with, while the boards are more firmly secured, and there is less danger of breaking the glass plates.

"When vignette pictures are not required, the plate, H, may be quickly removed by loosening the nuts, J, and turning the bolts, I, so that their heads can pass through the slots, *x*.

"It will be apparent that the vignetting plate, H, may be applied to frames of the ordinary construction.

"Without confining myself to the exact construction and arrangement of parts herein described, I claim, as my invention, and desire to secure by letters-patent:

A strip, F, applied to, and rendered adjustable in, a photographic frame, substantially as and for the purpose herein set forth.

"T. E. Sexton.

"Wilmington, Delaware."

TESTING COLLODION.

BY M. CAREY LEA.

A correspondent of "The Photographic News," Mr. Henderson, remarks, that in the early stages of photography, when photographers made their own collodion, he always tested his by focussing the bits of glass belonging to a kaleidoscope, the amount of impression which he obtained from the non-actinic colors determining the amount of sensitiveness of his collodion.

This reminds me of a contrivance which I made use of some time since for comparing collodions, the remains of which are still about my work-room, and which I will presently describe. But I do not think that the amount of impression obtained from a non-actinic color is in itself a true measure of the delicacy of collodion; *that*, I think, is to be measured rather by the amount of contrast which the collodion will give between two or more non-actinic colors, for precisely upon this depends its capacity to give the much-desired quality of *transparency of shadow*, which is nothing else than preserving the grades, or relations of force between sets of feeble impressions.

My test was expressly framed to fix this point, and was managed as follows: I took a large sheet of paper of a moderately non-actinic color, pale medium buff. I then took other still more non-actinic colors, dark reds, dark greens, browns, &c., and cut them into figures, with projecting arms,

such as stars and crosses. These were attached over the buff paper, and their arms were made to cross each other, so that as many different shades should be in juxtaposition as possible. This sheet was then photographed; and the various shades obtained with different collodions gave interesting information as to the qualities which they possessed.

But this alone could not be taken as affording full means of judging, for it was necessary that a collodion to be really good should discriminate also in the relative force of the bright lights.

To fix this, also, another sheet was prepared, this time of *white* paper, with various other shades of white, such as creams, bluish, paper with a faint yellow tinge by age, &c., which were made to contrast faintly with the ground and with each other.

This sheet was taken simultaneously with the non-actinic colors, and the examination of the general result furnished a criterion which, I suppose, may be taken as being as nearly correct as any that could be instituted.

If I were now to repeat the experiment, I should content myself with forming a sort of checker-board, as follows: Take a sheet of buff paper, eighteen inches square; prepare strips of red, brown, green, &c., about three inches wide, and attach them so as to form checkers, showing squares of the ground color between them. An actinic and a non-actinic checker-board of this sort placed upon a convenient piece of wood, would form an excellent object for testing collodions with.

A very simple and excellent test for deciding whether a collodion is sensitive to slight differences of shade in non-actinic color, I found to be, as follows: Take a sheet of buff paper, the laid sort, that is, showing the meshes of the wire-cloth on which it is made; set it up, and reduce it to one-hundredth, that is, one-tenth linear dimension. With a good collodion, the parallel lines of the water-mark should be visible to the eye at once. I do not give this as a severe criterion; any good collodion will accomplish that much. The sun should fall square on the paper; if inclined, the marks show more easily, especially if the paper be so fixed that they run vertically.

STEREOSCOPIC PICTURES.

We have received many kind favors this season in the way of stereoscopic slides. By Messrs. Carpenter & Mullen, Lexington, Ky., we have been sent some very beautiful specimens in this line, of great interest, and different from what we usually see. Among them are several very fine views of *Ashland*, the late residence of the immortal Henry Clay. The house is a substantial ornamental brick building, with a cottage, dove-cote, and other out-buildings, all evincing good taste and care, and all surrounded by lofty shade-trees. Through these trees, in one direction, we have a view of a long pathway, which was once the favorite walk of that noble statesman. The artist has placed an old gentleman in the pathway, which adds much to the charm of the whole picture.

Now follow five scenes on the Red River, above and below the dam, and of the beautiful valley of the Red River, outstretched and wide. They are all very successful pictures; but one of them is particularly so. It is of a quiet little brook by the hillside. The reflection in the water is so perfect that the artist thought best to mark "top" on it, as there is more sky in the water than above, and the surface of the water hard to find. The rocks and stones seem hung in mid-air. Either down, or right side up, it makes a grand picture. The effect is very singular and unusual, as well as beautiful.

"Mountain Cattle" is the subject of a very beautiful picture of a double team of oxen resting on the way with their heavy load. The animals were all very quiet, and one of them looking directly in the camera. Another picture of cattle is also very fine. It is called, "A View on the Licking;" and the cattle in the water drinking, lashing it with their tails in quiet enjoyment, and numbers pasturing on shore, make up a pretty picture of farm scenery. "Pilots' Knob Mountain," "State House Rock," "View on the Danville Turnpike," and the "Iron Works Road," are all very charming and romantic places, and are followed by views of the "Ford on Elkhorn Creek," view on "Hickman Creek," and the "Mouth of the Towascad Creek."

In the latter, we think we discover Mr. Mullin in the act of watering his horse, and his photographic wagon near by. "A View on the Licking River," "The Kentucky River Near Hickman," and "Merritt's Slide, on the Kentucky River," end this very fine series. We particularly admire the *tone* of these pictures; it is very fine. And while we are on the subject, may we not request that hereafter, when our correspondents are good enough to send us pictures, if they will not make it a point to send us their working formulæ entire, and a little information as to the instruments used, any little incidents connected with making the pictures sent, &c.? Their formulæ may be nothing new, yet it will be interesting to know that good results are produced by certain processes. We thank these gentlemen very much for their kindness, and hope they will still act on our suggestion.

If a lady visits another, and partakes of some very good cake or bread made by her hostess, her first query is, "How is it made?" and so it is with photographers. They want to know, when they look at a fine specimen of their art, what collodion, developer, silvering and toning solutions were used, and also the instrument. We trust our friends will not forget this hereafter.

Mr. John Carbutt, 131 Lake Street, Chicago, has favored us with about two dozen of his excellent views of the city of Chicago, all of which are in his own peculiar and most excellent style. Many of them are instantaneous, and are the most successful we have seen in this country. Among the latter are a panoramic view of the Chicago River; the Chicago River from Rust Street Bridge; and a river scene, looking south from Madison Street Bridge. In the first, we have a very busy scene, such as one may see on almost any river front. In the second, the scene is still more exciting with tugs steaming their way along, vessels sailing, flags flaunting in the breeze, people walking, and horses drawing their heavy loads up the steep hill. The third is a similar view, with more tug-boats, more steam, and more vessels. These are followed by an excellent picture of the State Street Bridge; elevators and lumber-yards, South Chicago; depot of the N. W. R.R. Co.; and several pictures of the immense grain-elevators for which Chicago is so famous. After these, we have over a dozen pictures of the different churches in Chicago, and several panoramic views of the most beautiful streets in the city, which really seem to make it almost useless for one to visit that city, if they desire only to see its beauties. These views are without a single fault or blemish; they are truly wonderful. Chicago can certainly boast of some very handsome churches and residences, and Mr. Carbutt has succeeded in making pictures of them when the light made them to appear to the best advantage.

He informs us that he used, with one or two exceptions, Dallmeyer's No. 1, quick-acting, single view lens, which is particularly fine for instantaneous work. Mr. Carbutt further says:

"The chemicals used were prepared similar to those described in the March number of *The Photographer*, for 1865. Nothing of moment occurred of photographic interest, except that I was seriously annoyed by streaky plates, and for all that I had prepared the baths I had with me with unusual care; the cause, I am convinced, was the using of a vulcanite bath-holder. This same trouble has occurred at every trip for nearly eighteen months, in fact, ever since I have used the vulcanite bath-holder, though I have tried well-known means to prevent its injurious effect on the bath—first, by repeatedly varnishing the inside of the cover and the dipper; this failed after awhile, when in a like manner I coated the inside of the bath, top, and dipper with paraffine. Since my return home, I prepared a new bath solution the same as before, used with a porcelain tight top bath and dipper, well varnishing the rubber attached to the top; and after six weeks' use, the bath is in good order still. The only object in continuing to use the rubber bath was its lightness for travelling; but I am compelled to cast it aside, and abjure rubber in any shape in contact with negative bath solutions."

While our friends are reading this, we hope to be with Mr. Carbutt on a photographic trip on the Upper Mississippi, which we shall give an account of in our next. We anticipate a great deal of pleasure.

From Mr. R. Newell, 724 Arch Street, Philadelphia, we have a number of stereoscopes taken at Cape Island. Some of them represent the belles and upper-tendom of our cities in their bathing costume, which looks very comical. Salt water clothing removes a great deal of romance and pride. Mr. Newell has been spending the summer at Cape Island, with his wagon, and did a very successful business. Some of his pictures are very amusing.

GLASS FOR THE STUDIO.

Feeling it to be of utmost importance to the photographers who read our pages, we have made considerable effort to present them with the best information concerning the construction of the studio, or glass house. These papers, we are glad to know, have been the means of doing some good; but we have neglected to touch upon one matter which is of too great consequence to be overlooked by those interested. We refer to *glass for the studio.* We have often been asked what kind of glass is best to use? and, for our climate, have as often recommended what is almost universally used, namely, a good article of window glass, frosted blue. Our reasons for this were that almost all kinds of window glass undergo a gradual change of color when exposed any length of time to the rays of the sun, and thus deterring more or less the transmission of actinic rays of light; and that the blue frosting, while it admits all the actinic rays and prevents any evil resulting from the change of the glass, it also gives a soft and beautiful light upon the model, agreeable to the eye, and only admits such light into the studio as the photographer requires. *Some kinds of glass, we are told, obstruct as much as thirteen per cent. of light.* We shall therefore, as we have opportunity and authority upon this very interesting and important subject, give it consideration from time to time. We now have to begin with the following very valuable remarks from Mr. J. W. Osborne, who has been frequently introduced to our readers in connection with his admirable photo-lithographic process.

Our readers will no doubt feel very grateful indeed to him. We know Mr. Osborne has given the subject much attention, as he is himself erecting an immense glass house in South Brooklyn, for the purposes of his process. He says:

"In the recent numbers of the *Philadelphia Photographer* you have devoted much of your space to a discussion of the form and construction of the glass-room, and the best conditions for lighting the sitter. Connected with this subject there is one which interests me at present a good deal, and I believe I need make no apology for bringing it under your notice, being sure that it is of practical importance to all photographers working under glass. I refer to the gradual change in color which many kinds of glass undergo when exposed to the continued action of light and atmospheric influences. These phenomena have been investigated by Mr. Thomas Gaffield, of Boston, whose experiments, prosecuted through a lengthened period, have resulted in the accumulation of many very interesting facts. I send you a paper read by him some time ago, which I doubt not you will think worthy of being reproduced in your Journal. Indeed, the information it contains cannot be too widely disseminated, to caution photographers, on the one hand, of the risk they run in selecting colorless glass, and on the other, to stimulate manufacturers to produce a better article than that which they give us at present.

"Mr. Gaffield's researches are the first which have been made in this direction. Others have observed the change perceptible in certain samples of glass, but he has devoted himself to the systematic investigation of the phenomena and the recording of facts. The photographic public are indebted to him, and they certainly ought to be made aware of their indebtedness. I trust also through you we shall have other workers in this field. I have had some interesting correspondence with this gentleman, and learn that he has continued his experiments since the date of his paper.

"One of these may be recorded here, for it tends to establish the true photo-chemical nature of the changes in color he has observed. Pieces of sensitive glass were ex-

posed under other glasses of various colors. Those under blue underwent the modification in color almost as completely as if they had been illuminated by white light; those under purple came next, while those covered by yellow, red, and green glass, suffered hardly any change. Mr. Gaffield is inclined to attribute this alteration in the tint of window glass chiefly to the presence of the metal manganese.

"I need hardly lay stress upon the disastrous effect which a gradually increasing yellow tinge in the glass of the studio must have upon the time of exposure. Of what use is it to trouble ourselves about quick-acting lenses and pure chemicals, if we wantonly throw away a portion of the light which the sun pours down upon us, free to all,—a fraction, let it be remembered, of the actinic rays, which the eye takes but little note of and is unable to estimate.

"When next I visit Boston I shall enjoy the advantage of seeing Mr. Gaffield's numerous specimens, and shall strongly urge upon him the employment of photography itself as a means of estimating the comparative amount of change produced by varying exposures in different specimens of glass.

"Yours truly,

"J. W. Osborne.

"N. Y. City, 23d Aug., 1866."

Mr. Gaffield's paper, alluded to by Mr. Osborne, was read before the Boston Society of Natural History in December, 1863, and reported in Vol. IX, March, 1865, of the proceedings of that body, and we are indebted to Mr. Osborne for a copy of it. It was on the

Action of Sunlight on Glass.

The writer made some remarks on the action of sunlight on window glass.

"He believed that his experiments in connection with the subject were original as to their method and their extent, although it had long been observed in Europe that colorless or light-colored plate glass had turned to a purple hue by exposure to intense sunlight. One case* is cited of a change to a gold color; and one experiment, recorded by Dr. Faraday,* some forty years ago, proving that a light purple changed to a darker hue after eight months' exposure.

"Other experiments are on record showing the action of glass of different colors as media in the transmission of light and of heat; but none, with the above exception, showing the effect produced on the glass itself.

"An experience of some twenty years in the window glass business had only presented a few isolated cases of supposed change of color from this cause, which were attributed to some obvious defect in an article of inferior manufacture; but, within a short time, he had heard of the change of color in an article of superior manufacture, in a quantity of white plate glass, of which some lights had been broken out of a window in which they had been exposed to the sun.

"This fact coming to his knowledge, led him to try an experiment with several specimens of plate, crown, and sheet glass, during the month of July last; which proved that a month's exposure to a hot sun would change the best white French plate and all white sheet glass, such as is used for photographs and engravings, to a color containing more or less of a yellow hue. The dark green and dark blue, or bluish green, did not experience any change; but any hue which approached a white, whether bluish, greenish, or yellowish white, turned to a yellowish color.

"A second series of experiments, commenced in July, and continued three months, on some thirty specimens from France, England, Belgium, Germany, and the United States, only confirm the results of the first; and a daily examination at first, and afterward from week to week and month to month, revealed the interesting fact, that even after a single day's exposure to a July sun, the change of color will, in some instances of the lightest hues, commence.

"So remarkable was the change in a week, affecting nearly all the light-colored glasses, that Mr. Gaffield commenced a third experi-

* Journal of Society of Arts for February 15, 1854.

* Dr. Faraday's Chemical Researches. London, 1859, p. 142.

ment on the 6th of August, which should speak for itself. He then exhibited to the Society ten pieces of French white plate glass, four by two inches in size (all of which were cut from the same sheet), one of which showed the original colorless glass, and the others exhibiting the change of hue towards yellow, after exposure respectively of one, two, and four days, one, two, and three weeks, one, two, and three months.

"The changes in the first four days were slight; but the last specimens were so yellow as to exhibit a contrast very marked, and excited the interest of all the members present. That the color permeates the body of the glass, and is not confined to the surface, or produced by reflection therefrom, has been conclusively proved by grinding off about one-sixteenth of an inch from both surfaces and the four edges of a duplicate exposed specimen, which, after repolishing, still exhibited the same yellow color.

"The glasses exposed were all what are called colorless window glasses, although they varied in tinge and hue from the whitest French plate to the darkest green English sheet glass.

"An experiment for four months, from July to November, on really *colored* glasses, red, green, yellow, blue, and purple, showed no change, except in the purple, which became slightly darker.

"The experiments were carried on upon a rough plate glass roof, nearly horizontal, and which received the rays of the sun during the greater part of the day. In all cases, strips corresponding to those exposed, and cut off from the same pieces, were placed in the dark, to be compared with the other specimens after exposure.

"It will be noticed that the dark green, blue, and bluish green, did not change. The color of the Belgian sheet (called German or French by glassdealers in America), a yellowish or brownish green, did not change; and these were the only exceptions. All plate glasses changed, except an inferior blue quality and a superior crystal plate of a greenish color, made in Germany and at the only factory which has not given up the use of potash for soda-ash.

"It is possible that a longer exposure of a year, or of years, might change every color in some degree.

"His inquiries, since he instituted these experiments, have brought out some fine specimens of Belgian sheet glass from a house built three years ago, which had changed in some instances to a golden, and in others to the well-known purple hue.

"It is Mr. Gaffield's intention to pursue the experiments farther, with a view to ascertain the effects of sunlight during each month and season of the year; and also whether exposure to heat, air, or moisture alone, out of the direct action of the sun's rays, will produce any corresponding change.

"Mr. Gaffield does not propound any theory to explain these changes of color, which, under our sunny skies, probably take place much more rapidly than in the different and less clear atmosphere of England.

"Some writers point to the presence of oxide of manganese in the original composition of window glass, and some to the oxide of iron, as a chief cause.

"Some writers have peculiar theories about the different classes of the sun's rays. Some may think the change referred to a molecular or chemical one; and others, wiser than the rest, refrain from any explanation, waiting for a larger multiplication of experiments, and a greater accumulation of facts, before educing any satisfactory law of nature which governs these curious and interesting phenomena.

"Mr. Gaffield makes no pretensions to any discoveries, unless it be to the very rapid change of glass observed in our climate in July, but only gives the result of his experiments, in the hope that the great interest now manifested in the subjects of light and heat may lead others to examine the matter, to repeat the same experiments in other countries, and to give the world the result of their researches, and enable the learned and scientific men of the age to explain this remarkable power and action of the sun's rays.

"It should be remembered that Mr. Gaffield submitted his specimens to the most severe tests, by placing them where they received reflected as well as transmitted light and heat. The change in glass, when glazed

in the windows of our dwellings and stores, is so much more gradual, that it very rarely attracts the attention of observers, except in the marked variation from white to purple."

In the *Photographic News* of Aug. 3, we also find some very valuable remarks by its talented Editor, Mr. Simpson, on this same subject, which we print almost entire. Mr. Simpson says:

"Two questions naturally arise at the outset: What kind of glass transmits the largest proportion of actinic light when first exposed? and what kind of glass changes least dangerously by long-continued exposure to sunlight? The first question may possibly be answered with tolerable accuracy; but in regard to the second the evidence is scarcely sufficiently definite to enable us to answer with absolute certainty. We propose, however, to glance at the evidence in existence, and we would, at the same time, strongly commend the subject to those who have accurate means of observation, as one demanding and worthy of careful experiment. Many years ago, Professor Faraday ascertained that certain tinted glasses became deeper in color when submitted to the action of light, and various experimentalists have from time to time since noted similar results; but the question has not been the subject of an exhaustive inquiry with an especial view to its bearing on photography. To make such an inquiry, a large number of examples of glass, with *details of their manufacture*, should be carefully tested during a few months of summer light. These descriptions of the tint and appearance of the new glass are sufficient, without details of the manufacture of the glass, or, at least, information as to the cause of the especial tint, or freedom from any tint, the glass possesses. Accurate data of this kind may, it is probable, be very difficult to obtain, not only from the indisposition of English manufacturers to enter into details on such subjects, but from the fact that many of the samples of glass in use are manufactured on the Continent and imported into this country."

He then makes the following remarks on

Glass Transmitting the most Actinic Light.

"There can be little doubt that the most perfect transparent glass for photographic purposes is the white crystal sheet, or white patent plate. The more completely colorless the glass is the more readily it will transmit actinic light. The notion was at one time somewhat prevalent in this country, and is still entertained largely in America, that an advantage was gained by the use of blue glass. This fallacy, unphilosophical in itself, has been more than dissipated by experience, no advantage being gained in point of actinic illumination, whilst a positive disadvantage has arisen from the cheerless effect of the blue light, from the difficulty of focussing and the misleading effect of the light and shade it presented to the eye. Blue glass does not transmit more actinic rays than colorless glass: the latter transmitting all that is admitted by the former, together with the non-actinic rays, which do neither good nor harm in producing the image. The best possible glass for the studio would be a perfectly colorless glass, which did not become deteriorated by exposure to light and air. How far the ordinary samples of colorless glass fulfil these conditions we shall consider shortly. Before entering upon the question of the change which various kinds of glass undergo after exposure, we may here quote a statement from an article in the *Photographic News*, vol. vi, p. 122, as to the amount of light intercepted by various qualities of glass in their normal condition. This statement is based upon a series of experiments made by Mr. F. H. Storer, in which the results were carefully estimated with a Bunsen's photometer. The light employed was artificial light from pure coal-gas, and the calculation does not necessarily imply the loss of actinism to the same extent. It may, however, be fairly assumed that the loss of illumination represents with moderate accuracy the loss of chemical action as well. For other details, and comments upon the experiments, we refer the reader to the article in our former volume; we here merely append the summary of results. For convenience of refer-

ence, the results are arranged in a tabular form. The first column gives the description of glass employed, the second column the thickness of the sheet, and the third column the loss of light in percentages, taking the whole amount of incident rays at 100.

'Single German' window glass,	$\frac{1}{16}$ of inch.	4.27 per ct.
Thick Eng. plate,	$\frac{1}{3}$ "	6.15 "
Crystal plate,	$\frac{1}{8}$ "	8.61 "
'Double English' window glass,	$\frac{1}{8}$ "	9.39 "
'Double German' window glass,	$\frac{1}{8}$ "	13.00 "
English crown,	$\frac{1}{8}$ "	13.08 "
Orange col'd window glass,	$\frac{1}{16}$ "	34.48 "
'Berkshire' enamelled, *i. e.*, ground only upon portions of its surface, small figure,	$\frac{1}{16}$ "	51.23 "
'Double German' ground,	$\frac{1}{8}$ "	62.34 "
'Berkshire' gr'd,	$\frac{1}{16}$ "	62.74 "
'Single German' ground,	$\frac{1}{16}$ "	65.75 "
Green col'd window glass,	$\frac{1}{16}$ "	81.97 "
Purple col'd ditto,	$\frac{1}{8}$ "	85.11 "
Ruby col'd ditto,	$\frac{1}{16}$ "	89.62 "
Porcelain transparency (Tyrolese Hunter),	$\frac{1}{16}$ "	97.68 " "

We cannot agree with our friend that the "fallacy" of using blue glass "has been more than dissipated by experience." We do not use it because we "gain" anything "in point of actinic illumination," but for the reasons stated above. We find it much pleasanter to focus in it than in the glare of a light without it, and are very seldom misled by it. Its advantages are too plain to make us discard it, when we compare the specimens made respectively under the blue and under the colorless glass.

Mr. Simpson closes his paper by the following, on the

Deterioration in Glass from Exposure.

"The change in the color of glass from photogenic causes is due to the nature of the metallic oxides entering into its composition. Faraday noticed, many years ago, that glass containing manganese was apt to turn purple under the action of light. In a paper read before the British Association at Birmingham, in 1849, Mr. G. Bontemps stated that glass containing manganese turned yellow on exposure to light. He says:

"'Having melted for the celebrated Augustin Fresnell the glass for the first polizonal lenses he made, and for which the whitest glass was desirable, these prismatic pieces of glass became yellow after a short time, without losing their transparency or polish of surface. I rightly attributed this color to the presence of manganese.'

"And in subsequent experiments he got rid of the change of color by suppressing the manganese. He further ascertained that the change was due to photogenic causes, by exposing a piece of the glass to sunlight and preserving the piece from which it was cut in the dark: the latter retaining its purity and freedom from color, whilst the former turned yellow. He further noticed the tendency, in some samples of Bohemian window glass, to assume a purple tint when exposed to the action of light. Some samples of glass, he remarked, containing manganese, changed color during the annealing process, if long exposed to heat; and he expressed a conviction that the tendency to change during exposure was in some measure modified by the degree of annealing the glass underwent.

"In 1857, Mr. Forrest brought under the attention of the Liverpool Photographic Society the changes which glass underwent during exposure, and stated the results of his observations during several years. He found that white glass was apt to change to a purple tint, which materially obstructed the actinic rays. From an examination of the blue glass in the windows of York Minster, in which no change was apparent, the exposed portion appearing the same as that protected by the lead, he arrived at the conviction that glass, slightly tinted blue by means of cobalt, would transmit more actinic rays than ordinary white glass, and that it would not change under the action of light. He further stated that the glass least liable to change was the Ravenhead plate glass, which has a slight blue tint. It should be here observed, that many samples of what is termed white glass have a slightly yellow tint, and if a tint be present at all,

we can readily concede that it is better that it should be blue than yellow. At a subsequent date, a committee, appointed by the Liverpool Society, reported the results of certain experiments undertaken to test the actinic value and tendency to change of various samples of glass. The general conclusions at which they arrived were, that some samples of blue glass were liable to change, whilst others were stable, but that the best did not transmit more actinic light than some samples of ordinary sheet glass; and that whilst the whitest glass changed the most, it was, even in its changed condition, superior to any of the other samples they had tested.

"There is another change to which many samples of white glass are subject, which has frequently come under our own attention, and which is not noticed by the authorities above cited: we refer to the tendency to a decomposition of the surface, called 'sweating,' from which a serious loss of polish and transparency, and consequently of power to transmit light, ensues. This, together with the prevalent tendency to become yellow, destroys, unfortunately, much of the otherwise undoubted advantage of the colorless samples of glass. It is, however, more easy to say that some samples of glass should be avoided than to determine which should be selected. On the whole, we incline to believe, from a consideration of authorities and from personal observation, that the thin sheet glass, with a bluish-green tint,—we believe of Belgian manufacture,—will be found to possess the greatest number of advantages for glazing the glass-room, as obstructing very little light at the outset, and having little tendency to change. The fact indicated in the tabular statement we have given above, that ground glass obstructs such a large percentage of light, is suggestive of the importance of preserving the glass in a condition the further possible from that of ground glass. The presence of a coating of dust or dirt, too common on the glass of studios, produces an effect closely approximating to that of grinding the surface. It is of vital importance, then, to keep the windows clean."

Mr. Simpson confirms Mr. Gaffield's remarks in relation to the tendency of white glass to change color under the action of light. No doubt every one has noticed the "sweating" alluded to, and we have frequently, in the summer season, seen skylights almost covered with a thin scum of dirt, robbing the studio of much of very valuable light, besides diffusing it to great disadvantage.

PHOTOGRAPHY IN GERMANY.

No. III.

BY DR. HERMAN VOGEL.

The Troubles of an Editor—Photographic Secrets—Cleanliness in Photography—Instantaneous Portraits—Braun's and Vogel's Formulæ—Solubility of the Salts of Iodine—Action of the Bromides and Iodides in Collodion, &c.

DEAR SIR: Nothing is more disagreeable than to be the editor of a photographic journal. He has all sorts of readers to please; the one a practical photographer, the other a chemist, the third an artist, the fourth an optician, the fifth an amateur who does not understand anything, and all these have to be satisfied. The practical photographer fancies nothing but formulæ; he does not read theoretical essays, which are of interest to the chemist, who, in turn, looks with contempt on art studies that are fancied by the artist, and on mathematical problems or chemical formulæ as he would on the signs of the Cabbala. "Why don't you give us articles on photographic optics?" asks an optician. "Your formulæ are useless to me." "Your articles are not scientific enough," says a chemist. "Do not waste space with mathematical problems," cries the artist; "we do not understand them." And thus everybody thinks the journal must be written expressly for him, while the editor must choose for his motto Goethe's sentence:

"**Wer vieles bringt wird manchem etwas bringen.**"

Here, in Germany, in the intelligent Germany, many photographers, and especially those in the smaller towns, are given to a peculiar superstition; they believe in arcana. They attribute the success of a contemporary not to his superior intelligence,

his artistic taste, nor to his cleanliness or greater skill, but to some secret formula, and like Tetzel, of old, who sold letters of indulgence to the people, so photographic Tetzels travel from town to town, pick out the stupid for their victims, and sell to them photographic "arcana" for ten, twenty, or more dollars. There exists, for instance, a swindler who sold the following three formulæ:

1. Preparation of an instantaneous collodion.

2. Collodion by which negatives can be made without the nitrate bath.

3. A process for burning photographs on porcelain by means of a spirit-lamp.

He never exemplifies his formulæ, nor does he run the risk that a photographer will test them in his presence, because they all require substances that are not readily found in photographic laboratories, or that do not exist at all, as, for instance, the "acetic nitrate of the oxide of manganese." This individual intends emigrating to the United States, and I caution your countrymen against him.

A provincial photographer, who made horrid pictures, asked me for my formulæ. I forwarded them to him with a great deal of pleasure; but his pictures, instead of better, became worse, and he insisted that I had concealed something from him. On my invitation, he came to Berlin, in order to become personally acquainted with my mode of working. He watched me closely, but without success. He would whistle a tune while the plate was in the bath because he had heard me do so; he would always put the plate in the plate-holder with the left hand because I had done so. He would remove the cover from the lens, and pour on the developer exactly as I had done; but one thing he did not do. He did not wash himself; he did not mind taking the plates out of the bath with his fingers still wet with hypo, or wetting filters with hands wet with developer. After two days' trial, I told him my secret—"wash thy hands."

There are many operators who have not yet learned the rudiments of photographic cleanliness. I frequently notice operators in regular photographic establishments, who measured successively water, acetic acid, ether, and bath solution in the same measure, without rinsing—who would wipe the plates with a cloth spotted with silver, or wet with hypo, and who silvered, fixed, and toned in the same dish. Such men are astonished when, in testing a new formula from a photographic journal, they meet with indifferent success, and they never lay the fault at their own door, but blame the editor or the chemicals. Even professional chemists are not sufficiently careful. Small organic impurities, that would be of no consequence in qualitative or quantitative analysis, or vapors in the room, are of sufficient moment to make photographic experiments impossible. I will not speak of awkwardness, which often prevents success. Give to a joiner a knife and a piece of wood, and he will make you a table; give it to a child, and it will cut its fingers.

Great importance is attached to the collodion; but it is not the collodion alone which is of so much consequence in taking instantaneous views. We also need a *fresh nitrate bath*, a *strong developer*, and an *extra rapid lens*. With these, it is even possible to succeed with a less rapid collodion.

Some years ago, Mr. Braun, while in Berlin, gave me a sample of his collodion. I found it less sensitive than mine; and its only advantage consisted in its keeping qualities, which is indeed of much importance to a travelling photographer. I give you the formula:

Iodizer—

Ether,	250 parts.
Alcohol,	200 "
Iodide of potassium,	14 "
Bromide of cadmium,	9 "

This is added to the plain collodion, made of

Alcohol,	250 parts.
Ether,	250 "
Gun-cotton,	15 "

If the collodion seems too thick, you may add one-sixth of equal parts of alcohol and ether. The bath consists of eight to ten parts of silver in one hundred parts water The developer contains:

Water,	1000 parts.
Sulphate of iron,	40 "
Acetic acid,	60 to 80 "

The collodion used by myself was made according to the annexed formula:

Iodide of cadmium,	1 grain.
" " sodium,	0.5 "
Bromide of ammonium,	0.5 "
Alcohol,	30 "

To this was added ninety parts plain collodion, containing two per cent. gun-cotton.

My bath contains:

Crystallized nitrate of silver,	8 to 10 parts.
Water,	100 "

And the developer:

Water,	100 parts.
Sulphate of iron,	3 to 4 "
Glacial acetic acid,	3 "

For portraits, I take more sulphate of iron than for copies. I formerly used bromide of sodium instead of bromide of ammonium in the collodion; but I now prefer the latter, as it is easier obtained pure in commerce than the bromide of sodium, which is frequently adulterated with sulphuric acid. It is also much more soluble in alcohol than the bromide of sodium. I give you the different degrees of solubility of some of the salts of iodine:

100 parts of alcohol, of 95 per cent., dissolve 8.33 iodide of sodium.

100 parts of alcohol, of 95 per cent., dissolve 0.8 to 1.3 bromide of sodium, when cadmium is present.*

100 parts of alcohol, of 95 per cent., dissolve 3 bromide of ammonium.

The presence of a cadmium salt (iodide of cadmium and bromide of cadmium) has a great influence on the solubility of alkaline salt. I found that the solubility of bromide of sodium, mentioned above, increases with the quantity of cadmium salt previously dissolved in the alcohol.

Allow me to add something more in regard to the collodion. There is an old saying, that we never stop learning; and even objects that have been familiar to us for a score or more of years present some new and interesting points on further scrutiny. This is proven, by my highly esteemed friend, your excellent contributor, Mr. Carey Lea, in his latest article on the influence of bromides and iodides in collodion, wherein he shows that the defects produced by an excess of a bromide in collodion resemble exactly those produced by an excess of an iodide.

I formerly pointed out, that if a small quantity of a bromide is added to a merely iodized collodion, the film loses its sensibility for strong light precisely as it gains in susceptibility for the action of the weaker rays. I have proved this point by taking a picture of a plaster bust, partially covered by black drapery. With an iodized collodion, I obtained a negative with very intense light, but without detail in the dark drapery, while, on the other hand, the iodobromized collodion gave the lights much less intense, but much more detail in the black drapery.

The outlines of the negative obtained by the iodized collodion were faint and vanishing, while the negative obtained by the bromized collodion was clear and sharp.

I now take the liberty to add some new facts to those published by Mr. Lea and myself. I also examined the action of a purely bromized, and of a purely chloridized collodion. Three samples of collodion were prepared; the first with iodide of cadmium, the other with an equivalent portion of bromide of cadmium, and the third with the same quantity of chloride of cadmium. With these, the picture of a plaster bust, partly covered with black drapery, was taken under exactly similar circumstances. The weather was clear, and the exposure given was one minute. The same developer was used throughout. The iodized collodion gave a very intense, but hard image of the plaster, and of the drapery only the lighter parts. The picture was dull, and the outlines indistinct. The bromized collodion gave no trace of the black drapery, and a clear, but weak image of the plaster. The chloridized collodion gave no image at all.

We observe, from these facts, that the action of a mixture of iodides and bromides is not to be explained by the action of its constituents alone. Mr. Lea's and my own experience only go to show that a bromo-iodized collodion, wherein the iodide greatly predominates, nearly resembles in its action a merely iodized collodion, and that a collo-

* I have not tested the solubility of bromide of sodium by itself, but only in the presence of cadmium or sodium salts.

dion wherein the bromide predominates has almost the same action as a purely bromized collodion. It is interesting to see the fact newly stated by experiment, that the addition of a chloride to an iodized collodion has the same effect as the addition of a bromide; it imparts to it softness, and clearness of the outline.

In addition to the above, allow me to make some important remarks.

I have written you on the sensibility of the pure bromide, chloride, and iodide collodion, and said that the *bromide* collodion in taking a white bust with a black drapery, did not give the least trace of the drapery; this is quite right, but only under certain conditions of the silver bath. The action is very different when the bath contains *iodide of silver* (as do all the ordinary nitrate baths for negatives), from what it is when free from it.

I sensitized a *bromized* collodion plate in an *ordinary* nitrate bath (containing iodide of silver), and the sensitized film appeared of a *gray, greenish* tint, very different from a bromide film sensitized in a *pure* nitrate bath, which was of a *blue color*, and *more transparent;* and I exposed these two films one minute on the plaster bust, with the black drapery, and developed with sulphate of iron. The film sensitized in the old bath, containing iodide, gave a fully exposed, soft image, with much detail in the black drapery. The other film, sensitized in the *pure* bath, gave an image as mentioned in my last letter—only the white plaster bust, and not a trace of the black cloth.

The reason of this behavior is, that a little quantity of *iodide*, contained in the bath, is precipitated in the collodion film. A prepared plate being brought into the silver bath, a part of the latter enters in the porous film of collodion, and gives up its silver by forming bromide of silver with the salts in the collodion; but the nitrate solution is thus weakened, and thereby it loses the capacity of dissolving the iodide of silver, which will be precipitated in the collodion film. When the bath is fresh, and contains only a little iodide, the iodide of silver precipitated in the film will be dissolved again on moving the plate in the bath; but when old, and nearly saturated with iodide of silver, it will not dissolve the latter, which then will remain on the plate.

I wrote especially on this subject of iodide of silver in the silver bath two years ago ("Photographische Mittheilungen," Nos. 1–3, and "Photographic News," 1864, p. 352).

To-day I received a letter from my friend, *J. W. Osborne, the excellent photo-lithographer in New York*, with a very interesting communication on the action of sunlight on glass. I hope you have already noticed the important paper written on this subject by Mr. Thomas Gaffield, your countryman, in Boston. He has found that window-glass exposed to the light undergoes a change in color. The alteration is not the same in all cases, either in kind or in degree; but there are few, if any, of the various kinds offered for sale, which retain their color for any length of time. The more colorless the sample of a glass, the more liable it is to change; and in that case, it very frequently assumes a yellow or golden hue. This fact is very important for photographers, because a very slight tinge of yellow will cut off a large percentage of the actinic rays. Allow me to add, in connection with this experience, a curious fact observed here, in Berlin, a long time ago, and told by the eminent professor of physics, Mr. Dove.

The owner of a manufactory of mirrors exhibited a fine one in his shop-window, across the face of which the name of the firm was mounted in brass letters. The business was subsequently given up, but this mirror was retained by the maker for his private use. It was found, however, that the removal of the brass letters was not sufficient to obliterate the name of the firm, and even after (in the assumption that the action was superficial) the surface of the glass was ground off and repolished, it was still impossible to obliterate the letters, which remained visible when looking on the glass in reflected light. The explanation of this fact is probably to be found in the change of color which the unprotected portions of the glass suffered during a long exposure. Faraday remarked twenty years ago, that the violet manganese glass will become brown and more opaque, in light.

THE NEW SIZE.

SOMETHING must be done to create a new and greater demand for photographs. Photographers in all directions are complaining that trade is dull. The *carte-de-visite*, once so popular and in so great demand, seems to have grown out of fashion. Every one is surfeited with them. All the albums are full of them, and everybody has exchanged with everybody. Since their introduction in 1861, they have had an immense run, and will always meet with more or less sale, but the demand that was once made for them, cannot be re-created or revived. The increased demand created increased competition, a villainous reduction in price, and a degradation of the art. Parties left their stores and their workshops and took to photography as a more profitable vocation, and the art grew wondrously. A great change has taken place however. Too many operators in the field, and the demand subsiding greatly, have caused business to be dull all around, and some are going back to their old vocations. It cannot be that the people have enough photographs, and that our art is on a decline, for as long as human nature possesses a bump of vanity, and as long as the love of one for another continues, so long will photographs be in demand, more or less. How to make the demand greater *now?* is the query. We think we have noticed that there is an inclination on the part of the public to sit for larger and better pictures than the carte-de-visite, and that operators have found that the tide is turning in that direction, though nothing new has been adopted yet. *The adoption of a new size is what is wanted.* In our experience, we have found that fashion rules in photography as well as in mantua-making and millinery, and if photographers would thrive, they must come into some of the tricks of those whose continual study it is to create a fashion, and then cater to its tastes and demands. Now we think photographers hold a great deal of prosperity in their own hands. Let a size that shall be universal, be adopted and properly pushed, and it will surely take. When you make a picture of a general, statesman, clergyman, or other noted personage, make a negative of the new size; put some of the prints in your window and show-cases, and mark them *the new size!* Let our leading photographers do this, and also get those who deal in pictures to place them in their windows also. Show them to your customers when they come in. Display the beauties and advantages of the new over the old, predict and comment upon its growing popularity and sure success, and *push it* in every way you can conceive of, and it will go. We will ourselves try to induce our leading album manufacturers to make albums to suit them, and think we can succeed if photographers will help and make the pictures. Let this be done also by our leading photographers *at once*, and before the holidays there will be an immense demand for the new size. Some discussion has already taken place as to what the size should be, and there have been two or three suggested herein already. Much depends on making it uniform the world around, so that wherever they are sent they will all fit the same Album.

Our English *confreres* have already taken the lead, are selling the pictures rapidly, and have the albums on sale. From our friend, Mr. G. Wharton Simpson, we have received a specimen picture made by Messrs. Window & Bridge, of London, and they call it the *cabinet size.* It is certainly very pretty, and beautiful in every way, and, we think, ought to take immensely. It is something like a carte-de-visite enlarged, but the proportions are better, and are as follows: mounting card, $4\frac{1}{4}$ by $6\frac{1}{2}$; print, 4 by $5\frac{1}{2}$; opening in the album, $3\frac{7}{8}$ by $5\frac{1}{4}$. The mounting board is of the thin material now used for the carte-de-visite, and shows a narrow margin at the top and sides, while the margin at the bottom is nearly an inch, and has the artist's card printed thereon.

In commenting upon the size in the *News*, Mr. Simpson very aptly says:

"It will be seen that the picture will resemble the card portrait in general form, and in possessing a narrow margin all around, and a wider margin at the bottom, where the artist's name, &c., are printed. The cabinet portrait is, however, a little wider in proportion than the card, in which it possesses a great advantage. The latter

once introduced of a given size, was of necessity kept the same size; but there can be little doubt that the proportion is not the best which could have been chosen; it is too narrow, both for pictorial effect, and frequently for the purposes of portraiture. How often it happens that a portion of the flowing drapery of a lady is cut off in the present picture, or that, to retain the drapery, the figure is placed in a position which suggests that it is just escaping out of the picture. It is also too narrow for pictorial effect, and certainly too narrow if judged by the standard sizes of canvas employed by painters. The new size is symmetrical in itself, and whilst offering facilities for bold and graceful portraiture, admits of such introduction and arrangement of accessories as contribute materially to pictorial effect. The examples before us, by Messrs. Window & Bridge, consist of full-length figures, like the ordinary card picture, three-quarter figures vignetted, and busts vignetted. The effect is exceedingly pleasing. The pictures are sufficiently large to give value and distinctness to the portraits, whilst the effect of finish and completeness due to the accessories, &c., in the card style, give the pictures a great superiority to the old bald 5 by 4 pictures, common before the days of the card mania. Mr. Notman, of Canada, recently sent us some examples of a similar class of picture he was thinking of introducing. This was a little smaller than the cabinet portrait, and followed more exactly the proportions of the carte-de-visite. The pictures were exceedingly pleasing, but we think the size an error. The effect was too much like that of an ordinary card slightly enlarged, from which it was not sufficiently distinct to make any revolution, or cause any new demand. Any diversity in the size would at once damp the ardor of the public. If, in making a collection, it is found that sizes vary, and will not fit the album, the general impulse given would be materially checked. Hence the importance of photographers acting with unanimity.

"This unanimity is not necessary only to maintain the demand once created, but to initiate it successfully. The new size should be introduced simultaneously all over the country, and, if possible, in America and on the Continent. Nothing so readily produces an insensible conviction of the truth of any statement, as hearing it constantly reiterated. Nothing will so effectually convince the public of the beauty and importance of the new size, as seeing it everywhere: in specimen cases; in reception-rooms; in publishers' windows. This will create the fashion, and convince the public that the fashion exists. This conviction once forced on the public mind, such a fashion will certainly prevail for a period.

"The introduction of the new size will cost photographers little or nothing. There is no permission of any patentee to be obtained; it will involve the purchase of little or no new apparatus. A good half-plate or whole plate lens will answer; half-plate glasses and half-plate cameras will also be used. Should the style be well introduced, and the demand become important, it is probable that lenses especially constructed for the purpose may be introduced. In the meantime, a good French whole-plate, or the well-known English half-plate lens, or a rapid half-plate like the 3 B of one of our English makers, will answer well. Pictures produced of this size will pay the photographer satisfactorily at just double the price of ordinary cards, the amount of material employed being little more than double that of cards, whilst the labor is of course not double. In proportion as the size is larger, this style will make a somewhat increased demand upon the skill of the photographer to produce good results, artistically and technically; but it also affords, in the same ratio, ampler scope for the ability of the skilful. Whatever tends to render necessary the exercise of higher capacity in the operator, is in our estimation a boon to the art, and in this respect the introduction of the new style will act beneficially. From a hearty, spirited co-operation amongst photographers for their mutual benefit, we can see a great advantage possible, whilst the effort cannot in any way interfere with the success of any other branch of the art. We subjoin some extracts from a letter we recently received from Mr. Window in answer to some inquiries we made. We especially commend attention to his suggestion as to flooding the windows

of dealers with published portraits in the new size, as one of the readiest means of arresting public attention by a novelty in the form of portraits intended for wide distribution. Mr. Window says:

"'I fully agree with you respecting the necessity of unanimity amongst photographers when essaying to introduce a new style. With it 'l'affaire marcherait comme sur des roulettes,' and without it all pains and trouble incurred by one or two houses must prove in vain. The size I have selected was chosen, not at haphazard, but after some considerable thought. I wanted to make a picture *and* a portrait. The shape of the carte-de-visite was against this last, as its size was against the perfection of the first. I also wished to adapt it to the capabilities of the materials to be found in most studios. The selected size is proportionately wider for its length than the C. D. V., and while giving a portrait that needs no glass to examine it by, shows more suitably the surrounding objects.. The want of this extra width has caused much of the crowding so objectionable in the works of many, even of the better class of artists. They can be taken with a whole-plate lens, though a 3 B or 4 B is better; and they go well upon a half-plate, leaving a sufficient margin for thumb-corners and draining marks, which are not to be avoided. I find in my own practice that they are very readily taken, and still more would prefer them to the C. D. V., but that they know their friends have not albums to hold them. I believe there is but one way to get over this difficulty, which once overcome, would open to photographers a new career. The pictures must be largely exposed in shop windows, and sold, albums for them being sold in the same shops. Of course the album once purchased, the owner's desire will be to fill it with his friends' pictures, at once. This is entirely in the hands of photographers themselves. We give six copies for a guinea, and three vignettes for the same sum, and we find that price considered moderate. But each photographer must suit his terms to his customers; and this would be too dear for many, while perhaps some could command a higher price. Yours very truly,

'FRED. WINDOW.'"

As the thing has been successfully started in England, we trust our photographers here will fall in line, and adopt the same size. The only objection we have to it is that it is a little bit too large to work on our $4\frac{1}{4}$ by $5\frac{1}{2}$ (regular half-size) plates, though by care this may be done. However, as the demand increases, new sizes may be easily made of glass, the holders enlarged a little without much cost, and all such difficulties easily overcome. We hope our photographers will enter into the thing with spirit and earnestness, for therein lies much prosperity and business for all who now complain. We should be very glad to hear any suggestions they have to make on the subject, and to see their specimens.

Since writing the above, Messrs. E. & H. T. Anthony & Co. inform us that they are manufacturing albums for the new size, and will soon have them ready. This is commendable enterprise, and will meet its reward. Photographers, go at it with the same earnestness, and a lively trade is before you.

SEASIDE MANIPULATION.

We have been regaled in your ever welcome pages, Mr. Editor, by accounts of "the trials of an amateur photographer's wife," and of the operator at his daily toil. I, however, have had another class of trials to bear, which were caused by my efforts at *seaside* manipulation.

Early in July, I went to Cape May to make pictures of the fashionables in their bathing-robes, on the beach. My first trial was to secure a room for printing and mounting purposes, my wagon serving me as dark-room admirably. The demand for such places was greater than the supply; but I finally succeeded, and with my chemical-wagon, and a large muslin awning for the purpose of posing the groups under, I had very fair accommodations *considering*. A hot, glaring sun, reflected by the white sandy beach, is very conducive to comic faces, and makes it almost impossible for one to keep up a natural expression. Having everything at hand, I commence putting things in order to go to work, when trial No. 2 presents itself, and I find I have one great

enemy to contend with. Chloride of sodium is a very good thing in its place, but on this occasion I got a little too much of it.

It is salt, salt, salt! *in* everything, *over* everything, *under* everything, *around* everything, and *on* everything! Let one work and manage to fix things up to a tolerably good working order, and the next morning, when he enters his wagon, he will find the enemy has been there before him, and, with mischievous hands, scattered a heavy salt dew upon everything again. Then comes the hurry to get things in working order; for one only has two hours to take negatives in at the seaside, and they are between 11 A. M. and 1 P. M., the fashionable bathing hours, so that it will not do to make a mistake. Every shot must be a hit; no chance to get another, for seaside subjects are like "birds on the wing, here to-day, but gone to-morrow."

It was usual to make our engagements the day before, for you must remember that the beach during the bathing hours is a perfect conglomeration of confusion—horses, carriages, goats, donkeys, men, women, and children running, jumping, screaming, and screeching—so that it would be impossible to arrange any of the preliminaries there.

Some time after the hour appointed your party arrives. They are "in a fearful hurry now," and greet you with, "I wish you would make haste!" A motley crew are they, full of noise and the loudest kind of fun. Before one can get a plate coated, they begin to scream at you, "Hurry up, old man!" "Come, we can't wait any longer! We will have to go. We want to go in to bathe!" But one can pay no attention to such exclamations; if he does, he will be so confused he will be sure to make a mistake.

After all is ready, by talking, persuading, and scolding a little, you get your noisy party quieted down; but they have attracted a crowd, and if you get your group without some of the outsiders in it, you are a fortunate man. The next group is a party of seven or eight young gentlemen, perhaps. Oh, what a noise! They are all talking at once, saying and doing a great many foolish things. A looker-on would certainly think they were "how come you so?" But that would be a mistake; they will be entirely different beings to-morrow morning, when you call on them at the hotel—got up in the very best and most fashionable style.

If you would study the influence of dress upon the manners and customs of society, you can get a very strong illustration of it here. Men and women whom you have seen in the ball-room looking so very sedate, and acting so very polite and dignified, you will meet on the beach the next day in their bathing-robes, cutting up like a parcel of very unruly children just out of school, with bare feet, dishevelled hair, and no waterfalls, balloons, or that sort of thing. The belles of our great cities, with their dignity washed off, exposing their merry natures; and perhaps it is all right, for I think it is a good thing to throw off the restraints of society once in awhile, for

> "A little nonsense, now and then,
> Is relished by the wisest men."

And these very pictures, taken often in the spirit of fun and mischief, will be in after years cherished as mementoes of the happiest moments of their lives; but these merry ones little think of the anxiety, and trouble, and trials they gave the poor photographer to get them.

I have had some pretty rough experience in my time in the pursuit of negatives under difficulties; but if any of your readers would like to know the trials of a photographer, let them go to the *seashore* and make pictures. They will no doubt get along swimmingly, as did Truly yours,

R. Newell.

[Mr. Newell's paper was accompanied by several stereographs, which amply verify his amusing statements. They are noticed elsewhere.—Ed.]

ON THE NATURE OF THE SUBSTANCE OF TANNIN.

BY M. CAREY LEA.

I have latterly endeavored to show that, although actual reduction may take place where iodide of silver is exposed to light in the presence of free nitrate, that this is never the case where the iodide was isolated, in which case the impression was always purely physical.

The position which tannin occupies rendered it very desirable to obtain a correct insight in the influence which it exerts, both on its own account, and as the representative of a class of substances which exert a more or less similar action.

Latterly, tannin has been called a "sensitizer," an incorrect expression founded upon the belief so long and, at one time, so universally entertained, that iodide of silver was, under some circumstances, insensitive to light. It may be more properly called an accelerator, inasmuch as it imparts a higher degree of sensitiveness than was before possessed; and the question which presented itself was, does or does not pure iodide of silver undergo a true reduction by light in the presence of tannin?

In order to settle this point, iodide of silver, precipitated in presence of an excess of nitrate, was digested for several days with liquid ammonia, to remove any chloride or bromide that might be present, was well washed, was covered with a solution of tannin of about the same strength as that generally used in photography, and was exposed to the bright light of a southern window on a clear day.

It darkened quickly in color; the coloration was very different from that which occurred when iodide was exposed, moistened with silver salt. In the latter case, the yellow iodide passes to a greenish-gray. Where the tannin was used, the effect of light was to convert the mixture to a reddish brown color. The succession of effects observable are, as follows: First, a darkening, then the assumption of reddish-brown. Those parts that dry pass to a bluish slate-color, and finally the whole mass turns to a dirty green.

The portions of altered iodide seemed to be distinguishable into two parts, a greenish-gray portion, that was heavier, and settled quickly after stirring up, and a bluish-gray, which was finer, and more easily kept in suspension in the water.

The first, or heavier portion, was well washed, and treated with nitric acid until the residue, by becoming bright yellow, showed that decomposition was complete. The acid supernatant liquor was then tested for silver, and exhibited a quantity so small that the liquor merely became slightly opalescent.

The other, or lighter portion, was treated with hyposulphite of soda, and then, after washing, with nitric acid. The portion which resisted the action of the hyposulphite became yellow under the acid, and this acid solution gave rather more marked indications of silver than the foregoing; still, it was only an opalescence.

I conclude, therefore, that, under the influence of light, tannin has a chemical influence upon iodide of silver; that this influence is in the nature of a partial reduction to sub-iodide; that in circumstances otherwise equal, the quantity of sub-iodide of silver formed, and under the influence of tannin, is not the one half, as has been affirmed on theoretic grounds, but very far less than where nitrate of silver, instead of tannin, is present.

SAN FRANCISCO PHOTOGRAPHIC ARTISTS' ASSOCIATION.

San Francisco, Cal., August 8, 1866.

To the Publishers of The Philadelphia Photographer.

Gentlemen: I am instructed by the President and members of the San Francisco Photographic Artists' Association to inform you that, at a general meeting of said Association, held at San Francisco, on Monday, August 6, 1866, a motion made by W. H. Rulofson, Esq., to pass a vote of thanks to the publishers of *The Photographer* for furnishing the profession on the Pacific Coast with the first intimation of the abolishment of the "stamp nuisance," was adopted by a unanimous vote. I am further instructed to request you, through the columns of your widely read Journal, to convey the thanks of the officers and members of the San Francisco Photographic Artists' Association to Leonard Myers, B. Van Riper, and G. H. Loomis, Esqs., and to the other delegates, for their successful efforts to abolish the odious stamp nuisance.

As, I believe, you feel a deep interest in all that appertains to the progress of the art, I take the liberty of informing you that the

proprietors of every photographic establishment in this city, except two, have united to secure the organization of an association having for its object the improvement of the art, and the prosperity of its professors. Twenty-seven members signed the constitution and by-laws on the first evening of the organization, and the several meetings held have been most beneficial in promoting good feeling and harmony among the members. As soon as the constitution, by-laws, and list of prices shall be definitely settled, I shall do myself the pleasure of sending you a copy, and from time to time, if acceptable, I will give you such information as may be at my disposal concerning the art on this coast.

At present, owing to the ruinous system of rivalry, which displays its worst features in the reduction of prices below the cost of production, business, though tolerably brisk, is not by any means as profitable as it should be, and, as I have every reason to hope, the organization of our association will make it.

Yours, very respectfully,
H. C. Bennett,
Sec. S. F. Pho. Art. Association.

[We feel very much flattered by our San Francisco friends. The effort to secure the removal of the stamp nuisance was a matter in which we took personal and active part; and we took pleasure in announcing the success of our delegation. A full and entire account of their proceedings, and of the new law, have appeared in our Journal only.

In conducting this Journal, it is our effort to present our readers with all that is of value and interest to them as early as possible, as thoroughly, and only what is reliable and to be depended upon. It is gratifying exceedingly to receive, in the midst of our labors, such a voluntary token of appreciation. We have a goodly number of subscribers in California, and it is with great pleasure that we announce the organization of a Photographic Society on the Pacific coast. With such good motives, they must succeed; and it would be well if similar societies, having like objects in view, were organized in all of our great cities. The villainous cutting down of prices, now so prevalent among photographers, not only kills the profits of the art, but *degrades* it extremely. Photographers should be under obligations not to sell at *less* than certain figures, and then charge such figures, or more, if they pleased. There is also a great deal of petty jealousy existing in the craft, which should also be removed. Would that such evils might be corrected everywhere!

We wish great success for our San Francisco friends, and tender them our pages for the insertion of their minutes, or anything that may be of any assistance to them in their good work. We hope soon to hear a very good report of them.—Ed.]

OUR PICTURE.

We have recently given our readers a little variety in the way of embellishments, and now turn again to that most charming branch—landscape photography—and give them a picture that we feel sure all will be pleased with. On being shown the first negative, mentioned below, we at once begged the artist to duplicate it for us if he could, that we might have the picture for our readers to look at and enjoy with us. The scene is one of those quiet places in the wild-wood, where one loves to go and be alone, for a time, from busy care and vexation, to rest body, mind, and soul. All around seems quiet, as if to listen while the soul breathes out its appreciation of nature's surrounding loveliness; or it may be to startle the strolling photographer as he approaches it weary and tired, and almost despairing. It seems to say to him, "I am yours; do what you will with me. I am here for your pleasure! Rest upon me; enjoy me; take me with you, for I am yours."

The picture has been remarkably well chosen. The negatives were made by Messrs. Hugh Davids and J. C. Browne, who have been working together considerably this summer with great success.

Mr. Browne has furnished us with the following notes respecting the picture:

"The subject presented in this number of the Journal, was taken a short distance above what is called the Red Bridge, on the Pennypack.

"This beautiful stream empties into the Delaware River a short distance above the village of Holmesburg, Pennsylvania; re-

minding the visitor somewhat of the Wissahickon, but wanting its peculiarly wild and picturesque scenery.

"The first negative was taken on one of the most perfect photographic days imaginable; the sky was bright, and the foliage seemed to be petrified. Does it ever appear to the photographic artist that foliage is frightened by the sight of a camera, as much as a flock of crows are startled by the presence of a gun? We have frequently driven by a charming spot, noticed the peculiar absence of wind, returned with the "traps," but what a change! Everything is in a flutter, absolutely refusing to be placed in our game-bag!

"But this blessed twenty-third day of June, was an exception; even the delicate fern and graceful river birch submitting to our manipulations without a murmur. Being shut in by high surrounding country, the picture was very slightly illuminated, but an exposure of ten minutes with an 8-inch globe lens, $\frac{1}{5}$ inch stop, produced all the detail with remarkable exactness.

"Afterwards, three negatives were taken of the same subject to print the edition for *The Photographer*, but the day was rather windy, spoiling some of the detail, though generally successful. The time of exposure mentioned may seem to most photographers, unnecessarily long; such may be the case, but we believe that a negative is more easily corrected from over exposure, than from too short a one, especially in a study of this nature, where detail and sharpness are of the greatest importance."

The prints were made by Messrs. Schreiber & Son, landscape and portrait photographers, 818 Arch Street. At an early period we hope our readers will be treated with another one of Mr. Browne's pictures, when he promises them his working formulæ with which he is so successful. He has been making some very successful instantaneous views, and placed his negatives at our disposal to choose from, very kindly. In our next number we shall present a charming child-picture, made by Mr. J. Inglis, Montreal, Canada. It will be entirely different from anything heretofore presented, and we shall print a large edition in order to meet all demands.

PHOTOGRAPHIC SUMMARY.

BY M. CAREY LEA.

GERMANY.

Dry Spots in Plates.—The question of the keeping of wet plates before exposure is one of considerable importance to photographers, so that a little further explanation is here given on the subject. An old bath evaporated till it contained fifty grains of silver to the ounce gave, even with very short exposures, dry spots. Simple dilution to forty grains to the ounce cured this perfectly, an argument in favor of weak baths for summer. Grüne found, generally, that if the plate rested fifteen minutes before exposure, better pictures were obtained, providing the temperature was not too high. Prümm agreed, but found a shorter delay advisable—four minutes. Jamrath had exposed a plate two hours, and then, by dipping again in the silver bath, had got a moderately good plate. Scheibler ascribed the fact that baths used with collodion, containing chiefly ammonia salts, did not dry so easily in the plates, to the deliquescent nature of the nitrate of ammonia formed in the bath. Prümm remarked, that those spots occasioned by drying could be removed by a brush; these were the rounded ones. Vogel ascribed spots often to absorption from the wood of the slide, and advised to dip it dry for five minutes in melted paraffine, which should be pure. Braun thought silver wire in the dark slide gave opportunity to the silver solution to flow down to the wood. (?) *Mittheil.*

Causes of Difficult Toning.—Bad paper—old paper long albumenized sometimes in fault; at others, paper two years old tones well. Beyrich advises to place albumenized paper for some hours in a damp cellar before silvering to remove excessive dryness. Stiehm agrees to this, or places a sheet of moderately damp blotting-paper between each half dozen of albumenized. Suck prefers to hang the paper up for some hours over vessels of water. *Ib.*

[Too much dampness is worse than too little, as it causes both the albumen and the salt to penetrate into the body of the paper, and destroys the brilliancy of the print.—M. C. L.]

FRANCE.

Enamelled Photographs.—The art of enamelling photographs has attracted less attention here than in Europe, where the fine portraits executed by De Camarsac, by a secret process, are in high repute. It is certain that any one who will here execute genuine enamels would find much encouragement, especially of those who desire to secure really permanent pictures of lost friends from existing negatives. The following process by Despaquis, the latest given to the public, is therefore translated and condensed:

Take—

Fine powdered gum Arabic,	1 ounce.
Water,	30 "
Saturated solution of bichromate of ammonia,	5 drachms.
Honey solution (1 part honey, 1 water),	1 ounce.
Enamel powder, a sufficient quantity.	

Mix thoroughly; pour upon a piece of plate-glass which has been previously rubbed with oxgall; support in a horizontal position, and let dry. When dry, coat with crude collodion; then pass a penknife round the edges, and take off the film. All this by yellow light.

Expose under a negative, collodion side next to the negative; the exposure varies, but is shorter than with chloride paper.

Soak for a time in water acidulated with nitric acid; this is necessary to remove the brown oxide of chromium, which will otherwise be converted into green by the burning, and tinge the enamel. When the soluble parts are removed, the film is transferred to the object which is eventually to support the picture, and which, by reason of the pliability of the collodion film, need not be flat; and after thorough drying, it is heated in a muffle till the enamel colors fuse into the support.

The burnt portrait may be retouched with the same colors used at first. The marks of the brush disappear to the second burning.

The enamelling colors are to be had in the market, ready prepared. As a flux, use:

Red lead,	6 parts.
Quartz sand,	2 "
Borax,	1 "

To be ground to impalpable powder, and intimately mixed. Use one part of enamelling color to two or three of flux.

Photog. Archiv.

Remarks.—By the above process, large sheets of sensitive material may be prepared, and cut up for use as required. Bichromate of ammonia is here recommended as a sensitizer; but my own experiments in this direction convince me that the double chromate of potash and ammonia is far preferable, because, whilst the bichromate film *must* be used within twenty-four hours, those with the double chromate will keep in a thoroughly dark place for a month. They do not, like the former, undergo a spontaneous decomposition in the dark, by which the whole film becomes soluble, and refuses to develop.

The double chromate is easily prepared. Take a strong solution of common bichromate of potash, and add ammonia to it till it smells faintly of ammonia (the smell in the room, generated by simply pouring out ammonia, is not to be confounded, as very easily happens, with the smell of the solution operated on), or till it turns red litmus blue; then empty out into a large flat pan, and leave to evaporate spontaneously.

The foregoing process is, of course, intended simply to give portraits in monochrome, except so far as color is introduced in the retouching, and burned in in the second burning.

Lochman's Universal Porcelain Printing Frame.

WHAT has hitherto, more than anything else, prevented the porcelain picture from being made in every room, and a favorite in every gallery, has been the want of a good printing frame.

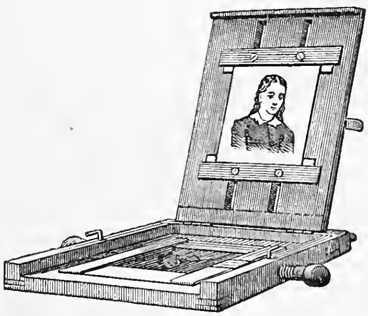
We present our readers with a cut and description of Lochman's patent pressure-frame for porcelain pictures, which is novel and ingenious, and, we believe, possesses superior merits.

Every photographer must have felt the want of a frame that will print in a satisfactory and expeditious manner the various sizes of pictures, from a $\frac{1}{4}$ to a $\frac{4}{4}$, using indiscriminately any size negative, from $\frac{1}{4}$ to a $\frac{4}{4}$.

This can be readily done with this instrument.

The general appearance of the frame is like an ordinary pressure-frame. The body in this is provided to receive a movable negative-holder, which admits either a $\frac{1}{4}$ or $\frac{1}{2}$, while the frame itself holds a $\frac{4}{4}$ negative. It can, of course, as readily be made to hold an 8 by 10, or longer plate.

The porcelain plate, of any size or shape, is held in its place on the lid of the frame by two movable bars, to each of which two screws are riveted, moving in two slots, to adapt the bars to the different sized plates.



In printing, all that is necessary, when the plate is ready, is to take two narrow strips of albumen-paper, and run the tongue over them to make them adhesive, and then paste them on the back of opposite edges of the plate. Let them project about one-fourth of an inch, and the projecting parts be placed under the parallel bars, and held firmly in place by means of the screws and bars. It is impossible for the plate now to have the slightest lateral motion, while, at the same time, when the lid is shut, and held down by the spring, it adapts itself beautifully to the negative, yielding horizontally to any slight undulation in either plate; and in this particular the frame presents undoubted advantages over all that have come under our observation.

The opalotype is one of the most beautiful pictures produced heliographically, and is very suitable for a small morocco case, Union frame, or velvet *passepartout;* and with Simpson's albatype collodion, properly managed, and Mr. Lochman's improved frame, we predict a new impulse to the production of the porcelain picture, which will not only prove interesting, but profitable to the photographer.

The fear expressed that the picture is not durable, we think is groundless. Mr. Lochman informs us that in order to prevent the substratum of albumen on the plate to prove injurious, he plunges his pictures, when printed, in the ordinary silver bath for albumen-paper for a few minutes, then washes them a little, and tones them in a weak bath. By this means, the albumen is coagulated, and so far changed as not to be so likely subject to decomposition.

Mr. Lochman's frame will soon be in the hands of the stockdealers, and we recommend our friends to give it a trial, and judge for themselves.

Salad for the Photographer.

We offer the following incident as a further caution to photographers to keep their chemical rooms closed from the intrusion of children. Our two-year old Miss paid papa a visit at the gallery one day this week, and while there, with her usual desire to be in mischief, strolled off, and made her way unobserved into the laboratory. Finding what she supposed to be the element she had so much pleasure in dabbling in (a crock of water) on the floor, in went one arm up to the elbow, then the other hand. Finding it not very clean-looking on being stirred up, she left it in disgust, and returned to the reception-room. The attendant, noticing her hands wet, wiped them with a towel. The next day she was surprised to find silver stains on her hands, and wondered how they got there. On our return home next evening, we were greeted by our better-half with, "Why, how did May get her hands and arms so stained? Just look!" and sure enough, there stood our little elfin with arms of a dark mulatto color, and her hands of such intense blackness that they would have put to shame a genuine son of Ham. After

cogitating on how this occurred, we came to the conclusion that she had mistaken for water a crock of waste silver solution, and into which we had the day previous turned the waste mother liquor of a previous crystallization. Before restoring her hands to their original color, we took a negative of her, and inclose you a print therefrom.

Chicago.

[Little May looks very dark and December like with her silvery hands, yet the picture of mischief and loveliness.—Ed.]

Developer for Negatives.—As there is at present a lack of new and *good* processes, I thought the following would please some brother *chip.* No redeveloping required!

Water, . . .	40 ounces.
Protosulphate of iron,	20 "
Gallic acid, . .	2 drachms.
Sulphuric acid, . .	3 "

The above is for stock. When wanted for use, take two ounces of the stock solution, and add two drachms of acetic acid, and seven ounces of water. *V.*

Mr. C. W. Hull's fine collodion receipt for dry plates:

Alcohol, ...	4 ounces.
Ether, ...	4 "
Cotton, ...	56 grains.
Iodide of potassium, .	36 "
Bromide of potassium, .	12 "
Iodide of cadmium, . .	12 "

Dissolve the iodide and bromide in a sufficient quantity of water; then add four ounces more of alcohol, making in all twelve ounces; add tincture of iodide until the collodion is a fine red color. *V.*

A young man died from the effects of cyanide in England recently. Do not use it.

A photographer in England has been *commanded* by the Queen to make some pictures for her.

The photographic eye is more sensitive than the living one; it can receive and register impressions too fine for human vision until increased light and new agency have improved our perceptions.

Lord John Russell.

Aerial Perspective.—To see a crow flying off with your focussing-cloth while you are going for water.

Distorted Image.—Your face after catching your foot in your tripod, upsetting your box, and breaking your ground-glass.

Width of Angle.—The distance between your feet when a two-horned masculine disputes your right to the field.

Aberration.—All dry processes.

When taking views, if near a stream of water, place a lot of wet leaves on your dark tent to keep it cool inside. *Br. Jour.*

A photographer in France has posted all over his building, "Reappearance of M. Millett at his ateliers. Tenors and Tragedians, look to your laurels!" *Ib.*

"It is desirable that every one should publish frankly the fruit of his efforts, and there will evidently result immense progress and improvement."—*Le Gray,* 1851.

The first Photographic Society was founded by M. Le Comte Montfort in Paris, in 1850 or 1851, and the first Photographic Journal was *La Lumière,* we believe.

"M. D.," a correspondent of the "British Journal," in a paper called, "Should Negatives for Enlarging be Varnished," quotes from some one else the following: "Never use a varnished negative, if at all possible." Will "M. D." please explain how we are to understand this? How *could* a varnished negative be used if it were *not possible?*

Polish for Prints.—Plain photographs, both on plain and albumen-paper, are much improved in appearance after rolling, by the application of a polish made of white wax, one-half pound; spirits of turpentine, one pint. Heat, and mix in an evaporating-dish. Apply with a white flannel rag very lightly, and polish quickly with a clean rag.

Neutralization of Acid Bath.—Vogel asserts that agitation with chalk reduces the strength of a negative bath, without thoroughly neutralizing the free acid, when that acid is nitric acid, and recommends carbonate of soda as every way better. *News.*

Editor's Table.

Sarony's Universal Rest and Posing Apparatus.—Although the photographer places what he calls a "head *rest*" at your head, any thing like "*rest*" is seldom experienced while one is having a picture taken, and we have often heard the remark made that having a tooth drawn is equally pleasant with being photographed. The reason of this is, that usually the subject is placed in a most uncomfortable position and told to keep "perfectly still" until the operator releases him from his mental and physical torture. *Rest!* Such a thing has been out of the question, as all know who have been photographed.

This state of affairs, however, need no longer exist. We have just returned from an exhibition of the wonderful advantages of Sarony's patent Rest and Posing Apparatus, and are perfectly charmed with it. Rest! Comfort! Ease! Grace! and Beauty! may all be imparted to the sitter by its use, and the feeling of constraint entirely removed. We felt quite as easy when supported by it as we do writing at our desk, and decidedly more so.

We will endeavor to describe it to our readers. It consits of an iron pillar screwed to the floor to secure a base firm and immovable.

The base may be covered with the carpet and be entirely invisible. A man's leg will hide the whole apparatus. Within this pillar a column is made to slide up and down by rack and pinion. To this is attached a cross-piece which moves on a centre, being readily placed in any position and fixed rigidly by the slight touch of a lever. In this cross piece the back support is fixed, and possesses a lateral movement of twelve inches, which in conjunction with the rotary movement gives wonderful facility in adjusting the back rest to any part of the back or side of the sitter, no matter what his or her position. This back rest has an ingenious movement by which it may be made to fit the broadest back or the most spider-like waist of the fair sex. The head rest is so admirably arranged as not to interfere at all with the present fashion of wearing their hair by the ladies, and may very often be entirely dispensed with. Another great advantage in this apparatus is, that an ornamental chair made for the purpose can be attached to it, swung in almost any position and made fast, thus affording a support for the figure and multiplying indefinitely the number of positions attainable by its use, all new and novel. The back of the chair is detached from the seat, thus enabling one to make the back high or low, the fringe hiding the junction between it and the seat.

The front of a carved cabinet may also be so attached as to make a rest for a standing figure which may be in front of or behind it, which will not interfere with the *crinoline*, and by the artistic arrangement of drapery can be made of great advantage in different posings. A table top may be attached in the same way for ordinary positions.

What impressed us the most was the extraordinary facility with which the whole apparatus could be applied to any position or figure, without disturbing the sitter in the least, and without any apparent effort on the part of the artist.

Mr. Sarony used both male and female figures in his trials of the apparatus, and no matter what position his subjects assumed they were perfectly at ease and comfortable. It will be certainly a very valuable acquisition to any photographic gallery. It is really used with less trouble than the ordinary rest. The parts are all well and handsomely made, and both operator and sitter will feel grateful to Mr. Sarony for his ingenious and valuable invention.

Mr. Sarony, the inventor, is a Canadian by birth, of Italian extraction, but has very extensive rooms in Scarborough, England, and is well known all over Europe. His brother, Mr. Napoleon Sarony, is now here with the apparatus, and as will be seen by his advertisements has opened rooms in New York for the sale of it, photographic studies made with it, albumen paper, &c., &c. We can hardly express ourselves freely enough about the studies, and it will hardly be necessary, for the low price at which they are sold will give every photographer an opportunity of seeing them. Mr. Sarony, however, is not only a photographer but a true artist. An hour spent with him has given us some ideas of posing and lighting entirely new and valuable to us, which we shall not soon forget. His exhibition of his apparatus to the artists of our city was worth witnessing by the most careful. He is a capital artist and an enthusiastic photographer. His "studies" will be entirely new to our readers both in position and manipulation, and are true gems of art. Among them are pictures of a *danseuse* represented in her most difficult posturings without apparent discomfort or a trace of motion; ladies in most graceful attitudes, and the rough, fat, burly Englishman, all made to look at ease with this useful apparatus, causing one to wonder how such could be done.

Photographers who can visit Mr. Sarony should do so. They will find him well versed in the study and practice of art and very entertaining indeed. We wish that every artist could possess one of his wonderful machines. They will certainly create a revolution in photographic portraiture, and ere long it will become *necessary* for every first class photographer to have one. Many of our best artists have already ordered them, and in France and England they are now in extensive use.

Mr. Sarony would call the special attention of photographers to his albumen paper. See advertisements.

To Our Correspondents.—We regret that we are compelled to lay over several valuable papers until our next, owing to the unusually early issue of our number. Those whose communications do not appear will please excuse us. Dr. Vogel has sent us a very valuable paper ou the pantoscopic apparatus, which was postponed on account of the sickness of our engraver, whom we hoped to be well enough to make the cuts, until we went to press with our last form. Mr. Sellers's Lecture and Ancient Photography continued in our next, with other interesting matter. We have also received a second communication from Messrs. Cramer & Gross on the bromide question, quoting a process from a French publication. We requested them to show us the work, that we might indorse their statements, but, having received no reply, also lay their paper over. Mr. Swan's carbon prints, and Mr. Inglis's children's pictures, shall have attention in our next also.

Photography on Silk.—One of our enterprising photographers is making "election badges," with the photographs of "the next Governor," on silk. He is turning them out in great quantities nearly as rapidly as on paper, and they are very pretty.

Mr. A. C. Platt, Oberlin, Ohio, has placed on exhibition in the office of Messrs. Willard & Co., 684 Broadway, New York, a very handsome oil painting, representing four tiny children grouped on a sofa in their motherless home, with the mother, represented as an angel, hovering over them in the clouds above. The pictures of mother and children are all from life, and photographed and grouped by Mr. Platt for this picture. This is one of the highest reaches that photography has yet attained. The whole picture is natural and lovely, and a great triumph of art in every way—an imaginary picture, with real likenesses of the figures. Mr. Platt has copied it nicely, and intends sending the original to the Paris exhibition.

Mr. Walter C. North, Utica, New York, has kindly sent us a negative of a lady, taken in a novel and beautiful style, in two positions. The picture will make a very excellent illustration of our late remarks on posing; and we are printing from the negative for the picture in our next issue, if we can get them done. Mr. North has made a great success in this negative, and it is just what we want. We regret that there is no duplicate of it that we may print more rapidly. More about it in good time. Meanwhile, thanks to Mr. North.

From Mr. R. O. Wood, Saratoga Springs, N. Y., we have received very fine eight by ten pictures of Congress and Columbian Springs, with a group of health-seekers in front of each. For pictures made in the open air, they are excellent, and very creditable to the artist. The figures are almost all distinct, except one little fellow, with his toes turned in, and an old gentleman, who apparently has been so anxious to get in the front of the group that he is in twice—that is, he moved—and has sundry noses, eyes, coat-tails, &c. &c.

Mr. Wood also sends us a couple of reproductions, which are very fair, but not equal to his other work, having been forced too much.

Messrs. Kilburn Bros., Littleton, N. H., have favored us with some more of their charming slides for the stereoscope. They possess every photographic beauty imaginable; and the sites are so bewitchingly chosen that one cannot help but sigh to be there, both to manipulate, and to rest, and to enjoy. "View from Echo Lake," "Eagle Cliff from Echo Lake," "Eagle Cliff from Profile Lake," "Mount Canon from Echo Lake," "Franconia Notch from Echo Lake," and the "Profile House, Franconia Notch," embrace this series. Too much cannot be said in their praise.

Mr. J. Inglis, Montreal, has favored us with a carte group, colored in most beautiful and tasteful style by himself, showing him to be quite as much at home with the pencil as with the camera, and well able to produce charming results with both.

Lieut. Col. Ottavio Baratti, editor of our valued contemporary, "La Camera Oscura," Milan, Italy, has sent us several very interesting

pictures of natives of the Island of Sardinia. Some of them are what we call the double or surprise pictures. We return many thanks to Col. Baratti, and will return the compliment. We will be glad to exchange specimens with any of our contemporaries abroad who desire to see American work as much as we do that made abroad. Will they please make a note of this?

"Although we have inserted in our Journal extracts or translations from this publication, and thereby indirectly acknowledged its excellence, yet, we think, we should call the attention of those of our subscribers who read English to the *Philadelphia Photographer*. Each of its richly filled numbers contains a variety of original articles by well-qualified writers, in the first rank of whom we would mention Mr. Carey Lea, the most prolific of all photographic writers, and whose name is well known in the photographic world. Each number contains, also, translations and extracts from foreign journals, a summary in which is noticed, with comments, everything of importance in photographic literature and journals, answers to correspondents, &c. The form is elegant, printing and getting up beautiful, and the price is, in proportion to what it furnishes, very low."—*Photographische Correspondenz, Vienna, Austria.*

[We thank our kind friend, Herr Schrank, for his notice of us. We always look with pleasure for his journal. Each number is accompanied by a photo-lithographic print, intended to teach posing and lighting the figure. They are very instructive, and add very much to the value of the journal.—Ed.]

A Curious Picture.—Mr. M. A. Kleckner, Bethlehem, Pa., sends us a very curious picture. Six young men are arranged behind and above each other, with high hats on. The face of the third from the front may be quite plainly seen through the hat of the one in front of him, there being but a shadow of the hat visible, yet quite plainly so. On the back of the card is an affidavit, stating that the hat was a "black cassimere one," and that the picture "was taken without any attempt at fraud or deception." How are we to account for it?

Mr. Henry Greenwood, publisher of "The British Journal of Photography," will please have our thanks for information given. We shall be glad to send him duplicates of any missing numbers of *The Photographer*, if he will tell us what they are.

In our next issue, we shall publish a very interesting paper by M. Carey Lea, Esq., on sulphocyanide of ammonium, which will doubtless be read with great interest. Mr. Lea is now giving the matter much careful study.

Our good friend, G. Wharton Simpson, Esq., editor of "The London Photographic News," will please have many thanks for a copy of "Mudd's Collodio-Albumen Process, and Other Papers." We shall read it during our leisure, and review it fully in our next, not having time to do so in this.

Mr. Simpson has also favored us with a specimen of *the new size*, which we comment upon more fully elsewhere.

Mr. J. H. Morrow, 629 Broadway, New York, whose microscopic pictures we took occasion to notice in our last, has sent us some very pretty specimens of his work, similar to those heretofore described. The most beautiful of all is a ring holding a very pretty stone ground microscopically with a picture in it. The other charms sent are also very excellent. These reproductions have the advantage of being set reversed, or not, as the photographer may desire, a thing unattainable in ordinary photographic printing. We suppose that some of our readers have already applied to Mr. Morrow for instructions. We think there ought to be a great deal of such work done during the coming season, and that it only needs a little push to make these pictures exceedingly popular.

Exchange Column.—As many of our readers will return from their summer recreation laden with a rich harvest of good things photographic, we will devote a space to those who are willing to exchange pictures with others, to announce the fact, and to state the region they have been working in. Let us hear from them.

Prof. Morton's paper on the Zentmayer lens was first read before the Franklin Institute.

ONCE MORE THE "BROMIDE QUESTION." FRENCH FORMULA, Etc.

Messrs. Benerman & Wilson.

Gentlemen: Permit me once more to speak upon the "bromide question" through the columns of *The Photographer*. Last week, I received from a party who desires to evade the "bromide patent" a copy of what he claims to be a "published formula," sufficient to defeat the same; and to the end that such a valuable (?) piece of information shall not go with the shades, I deem it important to give you and your readers this wonderful discovery precisely as it has been given to me, to wit:

"'Chimie Photographique.' Par Messrs. Barreswille & Davanne. Second edition. Paris. Mallet Bachelier, Quai des Augustins 55. 1851.

"Formula—

"Ether, ...	67 grains.	
"Cotton, ...	1	"
"Alcohol, ...	30	"
"Iodide of cadmium, .	1	"
"BROMIDE OF CADMIUM,	25	"

"The addition of bromide is principally useful in taking landscapes and copies. *It can also be used for portraits.*"

By the above formula, we get about one-fourth of an ounce; and if that contains twenty-five grains of bromide, one ounce will, of course, contain one hundred grains. It is in testimony in the Fredericks case, by French, English, and American photographic chemists, that the maximum amount of bromide to an ounce of collodion is about two grains, so that the formula given above *requires fifty times as much bromide* as that commonly and successfully used. Now, Messrs. Editors, the above formula has been sent me, with the request that I would answer whether or no it is sufficient to defeat the "Cutting Bromide Patent;" and I now answer, through the medium of your columns, that it does not even strike the patent's validity. If gentlemen would let their better *reason* be called in play while they are investigating this matter, they would find no occasion for asking counsel from any one upon such a formula as the one I have recited. If the formula was or is *good* and *perfect*, why was it not accepted and put in general use? The first person who made collodion pictures in the city of St. Louis, or the State of Missouri, learned the art of Mr. Cutting and his agents, and I have in my possession the original bond he gave not to divulge the same until such time as Mr. Cutting should see fit to publish it by application for "letters-patent;" and the same thing is true with reference to all the large cities, and none of them used, or have ever used, a formula with such extravagant disproportions as the French formula here cited, even if published as claimed. It is in contemplation of law, as it is in fact, but a mere suggestion, and is not at all such a publication as is necessary to defeat letters-patent when first granted even, and subject to the most severe tests. The process of Mr. Cutting, and its equivalents, is the process in use, and is and has been the only successful process—at least, so photographic chemists and experts have testified, and will again testify. Photographers may go on, and keep "fishing up" such fossil defences as this; and, in the end, they will find that I am not to be intimidated, but, on the contrary, shall, as fast as I can, give them all an opportunity to invest in litigations upon the subject to their hearts' content; but I do not propose to give them the benefit of a combination to defeat me, if the law gives me, as I believe it does, a remedy.

In the case of Woodworth *v.* Sherman, 3d vol. Story's Reports, p. 172, Judge Story uses the following language, to wit:

"1. What would be the legal effect of an actual combination to *resist* a patent is a question of much importance.

"2. It would seem that a combination of a number of persons to resist a patent approaches very near, if it does not actually reach, a criminal conspiracy.

"3. In many cases, it is lawful for individuals to do what *cannot* lawfully be done by a combination.

"4. An individual patentee may successfully resist an individual, when it may be much more difficult to resist the combined force of a great number of persons *united* to oppose his patent."

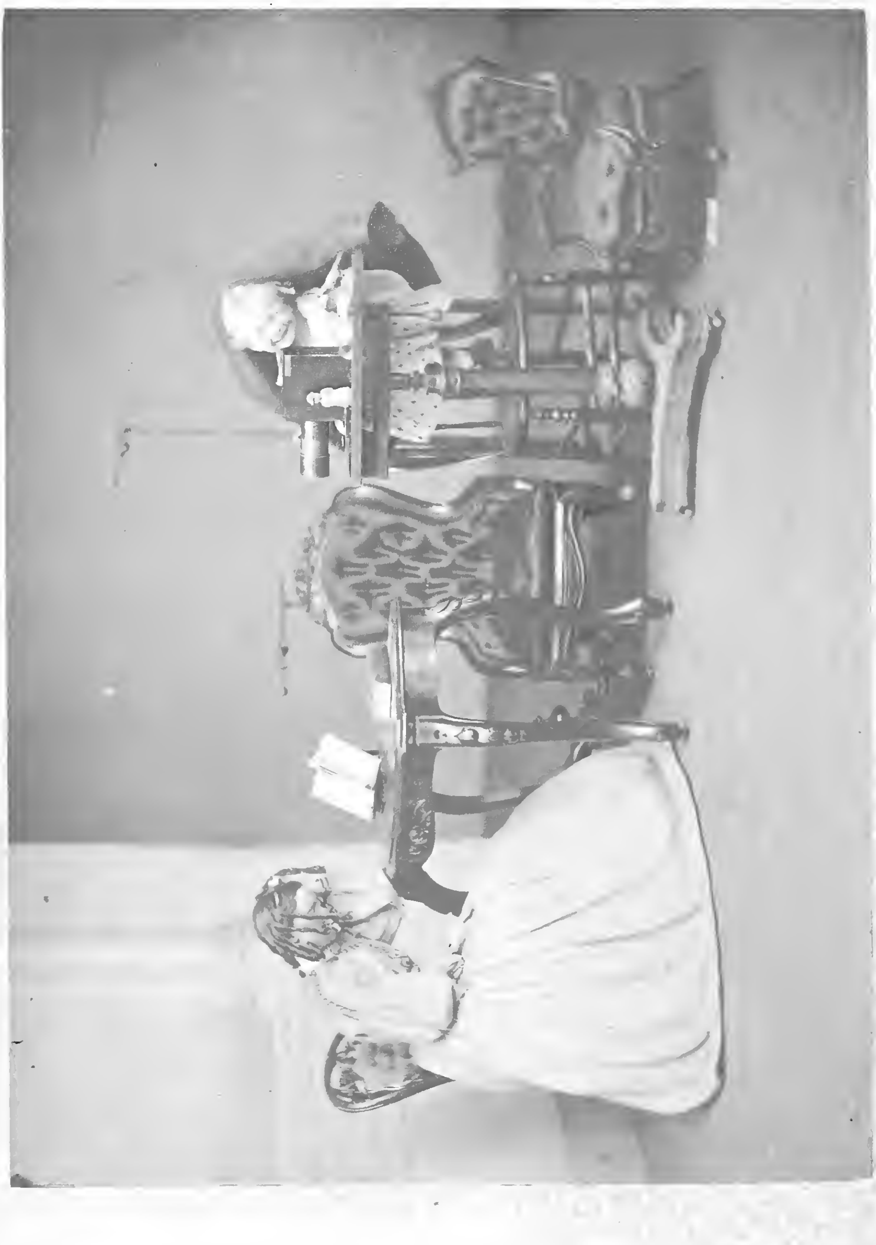
The court have decided in a recent case, in the State of Connecticut, that such a combination does amount to a conspiracy. Parties that have formed societies, and united themselves to oppose the "bromide patent," may continue to "fish" for something to defeat me, and, like "Micawber," "wait for something to turn up;" but they can rest assured I have knowledge of their operations, and intend to see whether the case is on my side or theirs.

So long as photographers compel me to *fight* for my rights, so long will they compel me to be severe, as well as just. If Cramer & Gross have any such publication as they claim to have, and will forward the same to you, I will, upon sight thereof, declare the patent null and void. Meantime, I shall push on the general canvass, to be ready shortly for the special canvass, when all will pay or be prosecuted. Some photographers have been inclined to evade me by hiding all their property. To such let me suggest the fact, that for infringement upon letters-patent I can have them *arrested*, to get relief from which will cost nearly as much as it would to pay my claims; and still the debt would be good against them. The publications that Cramer & Gross, and others, have talked about, cannot make any weight whatever against the patent; rely upon it who dares. I know what they are, and I warn photographers for their interest when I tell them they *cannot evade* or *defeat* the "bromide patent."

Respectfully,

T. H. HUBBARD,

General Assignee Bromide Patent.



THE

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On Sulphocyanide of Ammonium.

BY M. CAREY LEA.

In two former papers devoted to positive printing, I examined the circumstances connected with the appearance of silver in the whites of albumen prints, and the effect of different printings and tonings on the permanence of prints. This paper, which forms the third and concluding one, divides itself into two parts. In the first, I have endeavored to ascertain whether an old sulphocyanide bath, like an old hyposulphite bath, tends to make a weak print. In the second, I have examined the relative values of hyposulphite and sulphocyanide as fixers. The conclusions arrived at, especially in the latter point, are a good deal in opposition to received opinions, but will, I think, stand the test of criticism.

In an appendix will be found the results of some experiments on the toxical properties of the sulphocyanide.

I.

We all know that a hyposulphite bath changes very rapidly by use, and then tends to produce a peculiar effect upon prints fixed in it, to which the name of "sulphuration" has been given. Whatever this effect may be, prints fixed in such a bath rapidly deteriorate by keeping, and will not stand the action of the nitric acid test which I have proposed for examining the permanence of positives. The question whether an old sulphocyanide bath acts in a similar way has never, I believe, been decisively fixed. It has indeed been said that such a bath is not altered by use; but this has, I believe, never been supported by a careful examination of the prints so fixed, or any observation as to what takes place in the bath itself.

1. Into a solution of hyposulphite of soda a drop of solution of nitrate of silver was let fall. A white precipitate was, of course, produced, which immediately redissolved; but a brownish color was at once apparent through the solution, and at the end of twenty-four hours a black deposit was found in the bottom of the test-tube, probably sulphide of silver.

2. Similarly, a drop of solution of nitrate of silver was let fall into a solution of sulphocyanide of ammonium; a white precipitate was produced, which redissolved by agitation. At the end of twenty-four hours the liquid remained clear and colorless.

In these experiments the alkaline solvent was used in large excess. The conditions were now reversed.

3. Into a solution of nitrate of silver a small crystal of hyposulphite of soda was let fall. A permanent precipitate was formed, at first white, but soon darkening. At the end of twenty-four hours, it was entirely converted into a shining black precipitate.

4. Similarly, a crystal of sulphocyanide

of ammonium was let fall into a solution of nitrate of silver; the permanent white precipitate was quite unchanged at the end of twenty-four hours.

To render these trials more complete, it was thought advisable to examine the effect of a metallic chloride in the same comparative way.

Chloride of silver was precipitated from the nitrate by hydrochloric acid in excess. It was thoroughly washed, and divided into two portions in two test-tubes, with a little water in each.

5. To one of these, crystals of sulphocyanide of ammonium were added in quantity not quite sufficient to dissolve the chloride of silver by agitation.

6. The same treatment, with substitution of hyposulphite of soda.

These tubes were at once placed in a dark closet, and were examined at the end of forty-eight hours. The chloride under the sulphocyanide was perfectly white; that under the hyposulphite had a brown layer on its surface.

It therefore appears that there is less tendency to decomposition in the case of the sulphocyanide.

The solvent powers of sulphocyanide of ammonium vary with the strength of the solution; a given quantity of sulphocyanide dissolves much less silver when dissolved in much water than in little. In order to fix the solvent capacity, the following experiments were made:

Nitrate of silver. Thirty grains of nitrate of silver were dissolved in a small quantity of water; and it was found that a hundred and ten grains of sulphocyanide dissolved in five times its weight of water was a little more than sufficient to redissolve the precipitate which at first formed in it.

Chloride of silver. Thirty grains of nitrate were precipitated as chloride by hydrochloric acid, and were found to require, as might be expected, very nearly the same quantity of sulphocyanide. The chloride, however, naturally dissolved with less facility than the sulphocyanide of silver which the addition of the nitrate of silver to the sulphocyanide solution caused to be precipitated in the previous case.

It, therefore, appears that nitrate of silver may be taken as requiring approximately four times its weight of sulphocyanide of ammonium to insure its perfect solution, and the same for the chloride resulting from the decomposition of this quantity of nitrate.

In order to obtain a bath which should, as nearly as possible, represent the condition of a sulphocyanide bath after it had been in use a considerable time, the following measures were taken:

A solution of sulphocyanide of ammonium was divided into four equal parts. One of these was saturated with nitrate of silver (nitrate was added as long as the precipitate redissolved by agitation). Another was saturated with freshly precipitated chloride of silver. The remaining half was prepared as a fixing and gold toning bath in the manner hereafter to be described. Finally, the portions saturated with the silver compounds, after standing seven days, in order that any decomposition tending to set in might develop itself, were mixed with the other. Thus, the whole bath fairly represented a fixing and toning sulphocyanide bath which had been for some time in use for toning and fixing prints thrown into it without previous washing, and therefore contained the whole of their free nitrate. I should state that this contained one ounce of sulphocyanide for every four measured ounces of bath.

Some prints were made upon paper sensitized with fifty grain solution of plain nitrate of silver, with ten minutes' fuming with ammonia. These prints were then toned and fixed in the bath just described. A bath of plain sulphocyanide was kept at hand, through which to pass the prints before washing.

These prints were then cut to pieces, and portions of them were subjected to the nitric acid trial which I have already described. In every case they resisted perfectly the action of the acid. After a week's immersion, no lowering of density could be detected.

It seems a legitimate conclusion from this that the sulphocyanide bath does not, like the hyposulphite, tend to form mischievous compounds by use; on the contrary, it is perfectly free from this defect.

A word remains to be said on the tones

given by this bath. In these last experiments, I have encountered a great tendency to redness in the half shades, and also sometimes to a reddish discoloration of the whites. It was found that this last could be avoided by taking the prints out of the fixing and toning bath as soon as possible. When prints are thrown into this bath, they at first bleach very much, and pass to so pale a yellowish-brown color that one would suppose them entirely destroyed. They soon, however, begin to gain greatly in force, and pass to a dark sepia brown. As soon as this point is reached, they should be thrown into the plain sulphocyanide bath. In this way, the whites are perfectly preserved.

The reddish tones in the half shades would be a serious evil; but they are not in any way essentially connected with the use of sulphocyanide, as in some experiments, made a year ago, with the sulphocyanide fixing and toning bath, I obtained pure deep blacks with great facility. Experiment would probably have fixed the conditions under which desirable tones could be obtained; but, as in view of what follows, I do not think sulphocyanide is to be recommended in any form, it did not seem worth while to devote more time to this part of the matter.

II.

A careful examination was next made of the value, both absolute and relative, of hyposulphite and sulphocyanide simply as fixing agents. For this purpose, albumen-paper was sensitized on a fifty-grain solution of plain nitrate of silver. It was then carefully washed to remove the free nitrate of silver; it was then cut to pieces, and treated in the following manner:

1. A solution of hyposulphite of soda was prepared, the strongest usually employed in fixing positives, namely, one part of hyposulphite to four parts of water.

2. A solution of sulphocyanide of ammonium was prepared of the strength usually directed, namely, one part of sulphocyanide to two of water.

Pieces of the prepared paper were placed in these solutions, and left in them for five, ten, fifteen, twenty, and thirty minutes respectively, during which time they were frequently agitated. Before throwing them into the washing-basin, the papers treated with sulphocyanide were all duly passed through a second solution of sulphocyanide.

All these papers, after having been thoroughly dried in the dark, were placed under a very dense black and white negative, and were exposed to the sun for five or six hours, and for about an equal time to diffuse light. The result of this was unexpected and very curious. *Every* paper treated with hyposulphite had been perfectly fixed; even the one which had been but five minutes in the solution showed no signs of an image.

On the other hand, *every piece fixed with sulphocyanide showed a distinct image;* even the piece which had remained as long as half an hour in this very strong solution showed a perfectly plain image of the negative.

I think, therefore, that whilst the sulphocyanide of ammonium has the very well-marked advantage that it does not, by its decomposition, tend to compromise the blacks of the print, it is, at the same time, incapable of removing the sensitive compound from the lights. I am at a loss to imagine how this has passed so long unnoticed. It is true that the sensitive compound left is not capable of more than a slight darkening by light.

In concluding this series of papers on the subject of positive printing, it may be worth while to state the points which seem to have been settled by it:

1. Where fresh hyposulphite is used, the print is reasonably permanent, whether it has been fixed and toned separately, or at one operation.

2. Sulphocyanide of ammonium is not decomposed in the operation of fixing prints in such a way as to injure them. The only effect of use seems to be a simple diminution of its powers; and there seems no reason to believe that by the use of an old bath any effect would be likely to be produced upon prints in any way analogous to what is called sulphuration.

3. Developed prints, even when toned with gold, give little promise of permanency, and it is probable that, sooner or later, they will all fade, no matter how well and how carefully the operations have been performed.

4. Hyposulphite of soda will thoroughly fix a picture. Under favorable circumstances, the operation is complete in five minutes. Some silver is still left in the whites, but not in a condition sensitive to light.

5. Sulphocyanide of ammonium fixes so imperfectly as to leave a sensitive compound behind, even when used in very concentrated solutions. No prolongation of its action is effective; its power seems to be spent in a few minutes, after which it accomplishes nothing further.

6. The nearest approach to a complete removal of silver from the whites takes place where the print is allowed to remain for a considerable time in a toning and fixing bath. In some cases, this may extend so far that a solution of alkaline sulphide fails entirely to detect the presence of silver. Nevertheless, the use of the toning and fixing bath is not to be recommended, because tetrathionate of soda is rapidly formed in it, and prints toned in a bath when in that condition are very defective in permanency; nor can such a bath be improved by the addition of gold and of fresh hyposulphite.

APPENDIX.

INFLUENCE OF SULPHOCYANIDE OF AMMONIUM ON THE ANIMAL ECONOMY.

In view of the fact that this substance has been largely manufactured with a view to photographic use, and that the most varying accounts have been given of its toxical effects, it seemed to me desirable, in order to complete this investigation, that some experiments should be made on its hygienic relations.

Although sulphocyanide of ammonium contains the radical cyanogen, it does not necessarily follow that it must have the poisonous influence of simple cyanides; for the cyanogen may be so combined as to be completely innocuous. This is seen in the ferrocyanide, or yellow prussiate of potash, a substance which is formed by the union of iron with cyanide of potassium, and which is so innocuous that it may be swallowed with impunity. I was even informed some years ago, in Paris, by the distinguished pharmaceutist, M. Mialhe, that it had been tried as a form of administering iron, but was found to pass through the system unchanged.

It could not, therefore, be argued *à priori* that this compound should or should not be poisonous, and authorities seem to be divided on this subject. It has been said to be innocuous, on the one hand, and on the other has been pronounced to be a narcotic poison. The following experiments were made to fix this point:

Ten grains were given in milk to a rather large and strong (worthless) dog. No effect was observed to follow.

Twelve hours after, a further dose of *twenty-five* grains was given in the same way. An hour or two afterwards the dog seemed sick, was drowsy, and yet very restless, with a peculiar expression in the eyes; was uneasy, and frequently looked at his hind quarters. This effect gradually passed off; and when the animal's feeding time came, about six hours after the dose was ingested, he ate with his usual appetite, and continues to be well.

I am aware that we cannot reason with entire certainty from the dog to man, and that certain medicinal substances act differently on the two. Calomel, strychnia, and turpentine are very noxious to the canine race, acting far more powerfully than on man, whilst of aloes a dog will bear a dose that would kill a man.*

Nevertheless, the general action of drugs is apt to be the same in both cases, varying for the most part but a little in relative intensity.

I think, therefore, that we are justified in concluding, from the foregoing, that whilst sulphocyanide of ammonium may be a poison, it is certainly not to be ranked beside cyanide of potassium, and that it may be handled with *comparative* impunity. More than this it would scarcely be safe to affirm.

PHOTOGRAPHERS who are complaining of "dull times," should no longer do so. One of the craft in Venice offers a dozen portraits, *gratis*, to any one who will purchase two pounds' worth of views, and yet has no demand for gratuitous pictures.

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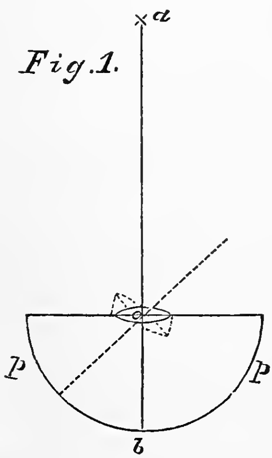
* "Youatt on the Dog." Lewis's edition, pp. 178–9.

The Pantoscopic Apparatus, and its Application to Trigonometrical Measurings.

BY DR. H. VOGEL.

THE ordinary photographic lenses have an angle of view of only 30° to 50°, and allow the taking of but comparatively narrow views; therefore, efforts were made long ago to enlarge the visual angle of photographic instruments. For this purpose, Martens has constructed an apparatus whose camera, during the exposure, is not (like the ordinary one) fastened, but turns round a vertical axis, which intersects the optical centre of the objective. In this turning, the neighboring objects enter successively into the field of view of the lens, and delineate their images on the plate, which, in Martens's apparatus, was cylindrically curved. Notwithstanding the movement of the objective, the image of a point (if its principal ray do not form too large an angle with the axis of the lens) hits always the same place of the cylindrical plate. The image of a point before the lens always lies on a line drawn from the point through the optical

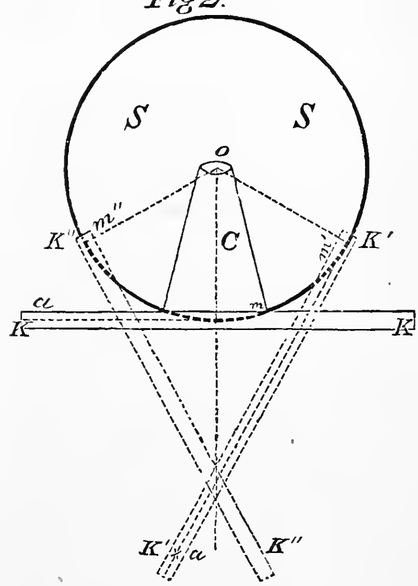
Fig. 1.



centre of the lens. If *a* be such a point, *o* the optical centre of the lens, *p p* the cylindrical plate in the focus of the lens, the image of the point lies on the line, *a o b*. If, now, the objective be turned around on its centre (as shown by the dotted lines in the diagram), the picture of *a*, according to the maxim before named, will nevertheless remain on the same line, *a b* (because *a* and *o* keep firmly their places), and, therefore, will hit anew the point, *b*, of the plate. Therefore, notwithstanding the rotation of the objective, all points of the objects lying in front are exactly copied. In order to keep off the rays, which form too large an angle with the axis of the lens, opposite to the latter a streak-formed screen, which follows the movement of the objective, is put before the plate. This apparatus was not adopted into photographic practice with collodion plates because operating with cylindrical plates is exceedingly difficult. *Martens*, therefore, improved his apparatus, according to the proposal of his nephew, *Schuller*, in Transylvania, by introducing a level plate, which, following the movement of the objective, is unfolded tangentially on the envelope of the cylinder, the which forms the place of the image.

Primâ facie, it seems impossible that such a movement may be exactly performed; but Martens and Schuller solved this problem in an admirably simple manner, without any

Fig. 2.



complicated mechanical expedient. The camera, C, is set on a circular horizontal disc, S S. The centre of the objective lies in the centre of the disc, and the periphery exactly coin-

cides with the envelope of the cylinder, forming the place of the image. The sensitized plate is put into a dark slide, K K, which can be removed in vertical direction to the axis of the objective. The situation of the box at the beginning and at the end of the movement is announced by dotted lines in Fig. 2. The apparatus is first brought into the position, K′ K′, and around the disc, S S, a wire of metal is slung, which is carried on from the point, m', in tangential direction, and fastened to the button of the box. The wire, which, of course, is situated beneath the box, is dotted in the diagram.

The apparatus is now allowed to rotate, and the dark slide successively occupies the positions drawn in the diagram. The least divergence from the tangential movement is marked on the image by vertical stripes and lack of sharpness at the respective places. The rotation is effected by the action of a simple clockwork applied to the lower part of the camera.

Martens and Schuller applied a second improvement. They made the streaked-formed screen at the top wide, and at the bottom narrow. In consequence of this, the image of the dark ground, falling on the upper part of the plate, remains for a longer time within the field of view than the images of the bright clouds, and of the sky, falling on the lower parts. In this way, the too long exposure of the bright, and the too short exposure of the dark parts, are prevented, and a detailing of the picture results which never may be attained in ordinary apparatus.

I was convinced of the great utility of the apparatus, which I formerly had but little faith in, when I accompanied on a ramble to the Wengernalpe, Switzerland, the photographer, Braun, of Dornach, who, in the last year, has taken hundreds of Swiss views with three apparatus of this kind.

This apparatus is not only for artistic purposes, but also for geodetical ones of especial importance. *It appears from the preceding, that each panoramic view is an unwound envelope of a cylinder, and therefore the azimuthal angles of the objects in nature are in the same proportion as the horizontal distances of lines in the panoramic views.* By means of a scale, distances may be, therefore, if the size of a degree be known, determined as well on a panoramic view as by direct measuring in nature by means of a theodolite, or a box-compass. In surveying a region by means of this instrument, and of sketching a plan or a map, it is necessary, first of all, to fix a right line—the station-line—whose length is to be measured accurately. The box-compass is successively put on the two extremities of the station-line, and the angles are measured which the visual lines of the different objects, whose distance shall be fixed, form with the station-line. The proceeding with the pantoscopic apparatus would be quite analogous; but instead of painfully aiming at every house, tree, or pale, plainly two views are taken from the two extremities of the station-line. Care must be taken that the apparatus is strictly horizontal, and levelled in such a way that on both images the other extremity of the station-line, marked by a small flag, is visible.

It would be advisable to place two flags more, whose visual lines form a right-angle, with the station-line; these flags must be visible in the picture. In such a way, two pictures result, by which the situation of all objects visible on the picture, of every shrub, every house, every pale, if necessary, may be determined to the utmost accuracy. If this should be executed with the ordinary instruments for measuring, days would be spent in measuring on one point of the station-line, and, nevertheless, these details would not be attained.

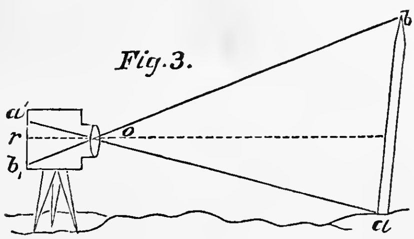
It is now very easy to determine the angular distances by the panoramic view. The radius of the rotating circle of the apparatus is known. The length of its circumference is $2\,r\,\pi$; the size of one degree, $\frac{\pi r}{180}$. Braun's panoramic views have an optic angle of 120°, and a length of eighteen inches. Therefore, one degree has the length of one and a half lines. It would be easy to determine by this, also, minutes and parts of minutes, by the application of a Norious.

These measurings must be, for the sake of precision, executed on the negative, since copies made by it always shrink up a little, and therefore variate in their length. In order to avoid this fault, it will be, as above

said, good to mark before taking the view, two points, which form an exactly right-angle with the station-line. The points are then also copied, and give the basis for further divisions of the picture. The part of the picture inclosed by them is divided into ninety parts, and thus results the length of one degree.

As well as the situation of the objects on the picture, the height of buildings, trees, or towers, may be determined by it. To accomplish this, there must be known: 1. The distance of the objects which must be measured from the station-line; this results, in the manner stated above, from two panoramic pictures. 2. The angle of view sight of the respective objects. 3. The horizon.

Fig. 3.



If $a\ b$ be a tower, $a\ o$ and $b\ o$ rays drawn from its top and bottom to the centre of the objective, the angle, $b\ o\ a$, is the angle of sight. The image, $a'\ b'$, of the tower on the plate, appears from the objective under the same angle, $b'\ o\ a'$. The horizontal line, $r\ o$, divides this angle into two parts, whose tangents are, $\frac{a'\,r}{o\,r}$ and $\frac{b'\,r}{o\,r}$, $o\ r$ is the focal length of the objective. The height from the spectator's horizon is then, if E be the distance, $= E\,\frac{a'\,r}{o\,r}$, and the whole height from the bottom of the object $= E\,\frac{a'\,b'}{o\,r}$. It is now important to fix exactly the horizon intersected by the optical axis of the objective. That may be done by two signs, which are placed, by means of a level, exactly in one horizontal plane with the optical centre of the objective, and which are afterwards copied on the image. For this purpose, the two perches may be used which served to mark the right-angle (see above).* Such a measuring of altitudes may, of course, quite as well be done by means of an ordinary apparatus as by means of a panoramic one. It is less exact for large angles of sight than the fixing of horizontal angular distances, since the objectives do not make exact work for marginal rays.

The latter method of measuring altitudes may also be used for fixing with some exactness the length of the station-line, if there is no time or occasion for measuring it. On one extremity a very high pole is erected, whose length is known, and the size, G, of its image on the plate measured.

If r be the focal length of the objective, G the length of the pole, g that of its image, E the distance, then is $E = \frac{G\,r}{g}$.

Even if a greater exactness be desirable than that offered by the above-described methods, the photographic takings would be of some value, on the one side, as a guide for theodolital measurings, as faults slip in very easily; and, on the other side, they would be of secondary importance for fixing points whose situation often is only fixed by taxation, in order not to lose too much time with direct measurings. The enormous importance for travelling geographers, and for soldiers, is obvious.

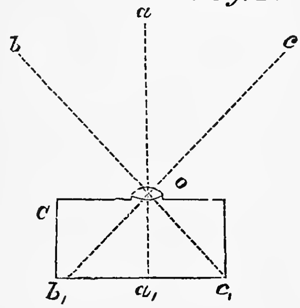
It is evident that even by means of an ordinary camera, according to the principles above, angles may be measured. However, not their angles, but at first their tangents are fixed.

The manner of fixing the azimuthal angles, according to this proceeding, would be the same as that of fixing angles of altitudes (above mentioned). For this purpose, we need: 1. The focal length of the apparatus; and, 2. The point of sight. B $a\ b\ c$ three points in one place, o the lens of the photographic apparatus, l the focussing screen, with the images, $a'\ b'\ c'$, of the points, $a\ b\ c$;

* It is easy to understand that measuring altitudes may also be done with an apparatus which turns around a *horizontal* axis. The arcs of the angles of altitudes may then directly be taken from the picture.

a the point of sight. It is evident that $\frac{a\,b'}{a\,o}$, $\frac{a'\,c'}{a'\,o}$, will be the tangents of the azimuthal angles; $a'\,o$ is the focal distance of the

Fig. 4.



apparatus. These fixings, however, are, in regard to their exactness, much inferior to those of the panoramic apparatus, because:

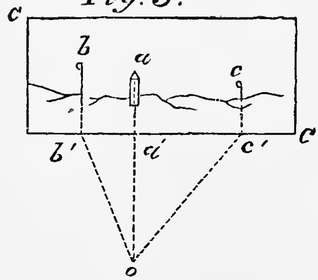
1. The exact fixing of the point of sight undergoes some uncertainties.

2. The focal distances are variable, and their exact measuring also difficult.

In the panoramical apparatus, as above shown, both difficulties are avoided.

For takings by a surveying table, this proceeding (with an ordinary apparatus) would be sufficient. The photographic picture might be transferred to a drawing-board, and

Fig. 5.



the angles immediately construed. If the little tower is the picture, the points, a b c, are projected on the base-line, a a' prolongated (a is point of sight), and $a\,o'$ made as long as the focal distance; and when $a\,c'$ and $o\,b'$ are drawn, there result directly the lines of direction for the objects, b c. But here is added an evil, the shrinking of the paper of the picture, spoken of already in regard to the panoramical apparatus, where, however, it could easily be avoided. Therefore, there would, in this manner, if all these circumstances are minded, only be attained an accuracy which would, perhaps, be equal to that of the table for surveying.

INSTANTANEOUS PHOTOGRAPHY.

BY REV. H. J. MORTON, D.D.

Having occupied some leisure days this summer in watching and helping, in a very humble way, the process of instantaneous photography, I thought it might interest the unscientific readers of *The Philadelphia Photographer* if the results and incidents of the efforts were laid before them. The operator was Mr. J. Coates Browne, certainly one of our most successful amateur artists; the scene of experiment the shores of the Delaware, about ten miles below Philadelphia, on the Jersey side, opposite to Maiden Island. The river here is a mile wide; but the main channel runs near the east bank, and it brings most of the vessels which pass close to the beautiful sandy beach which here borders the stream. Of course, all the down river and ocean traffic with Philadelphia passes by this point, and no one unfamiliar with the daily witnessed spectacle can fail to be astonished at the number and variety of vessels which glide up and down this noble stream. At times, the whole extent of the river is alive and white with sails. Ships, barks, brigs, schooners two-masted and three-masted, sloops and shallops and yachts, sweep along like flocks of swans, or flights of sea-gulls, while ever and anon majestic ocean steamers come grandly up, their eager and expectant passengers visible on their quarter-decks or forecastles, watching for the distant city, or gazing on the green shores, which look so very beautiful after a long sea voyage. River steamers, also, with bright-painted sides and crowded decks, glance by at amazing rates of speed, sparkling in the water divided by their sharp prows, or churned up by the swift-revolving wheels, while huge "tows" of coal-barges and vessels of larger tonnage crawl along behind the "steam-tugs," which

puff and snort out their white breath as if in terrible struggles with the immense trailing length which they are dragging up or down the river. Long after they have passed, their swell comes rolling on the shore, awakening the echoes, and giving new life to the already animated landscape. Up the stream to the northeast, the city steeples, and higher buildings (among which the gas-works at Point Breeze are very conspicuous), lift themselves over the low green point which interposes itself, near to which are some iron-clads and monitors, and captured blockade-runners, the last in striking contrast with the first-named craft, being perfect models of marine architecture, while the first are embodiments of ugliness, whose black, ball-dented, battered sides, and turrets, and smoke-stacks, suggest no idea but that of brute strength, or destructive energy awaiting development. They lie seemingly asleep on the water, like huge alligators or crocodiles; but we *feel* that they can be awakened in a moment, and that when aroused they will rush foaming through the sea, and make it boil like a caldron, and shake its very depths with the thunder of their awful voices, and the ponderous plunge of their prodigious solid shot or bursting shells.

But looking away from these distant objects, we find the channel directly in front of the point where the experiments were made, running close in shore, and bringing most of the passing vessels within a very convenient distance of the operator.

And here let me say to the uninitiated in photography, that this instantaneous work is beyond description curious, and unless witnessed might well be considered incredible. We will suppose a river steamer coming up with a strong flood-tide under foot, and travelling perhaps at the rate of sixteen or eighteen miles an hour. The camera is focussed and fixed, its lenses pointing to a spot in the stream through which the steamer will pass. The operator stands with a slide which covers the object glass of the camera, but has a square hole cut in it, which will uncover the glass for an instant as it falls into its place. The attendant stands behind the camera, and as the swift steamer flashes past —cries "*now!*"—there is a "click" as the slide is dropped at the call. The object-glass has been uncovered for just the moment that it took the slide to fall three inches. The steamer has been opposite to it for a single instant—for the winking of an eye—for the fragment of a second—yet lo! when the plate behind it is removed, and treated with appropriate chemicals, there she is, perfect in every part, her wheels turning, the foam flying from stem and side, the passengers each in the act of moving or at rest—every stick, and rod, and rope, with a distinctness and absolute accuracy which a painter could not rival if he had a week to work in, and the vessel at anchor!

It is the same with the passing ship. She comes up grandly, with all sail set,—spanker, and mainsail, and foresail, topsails, top-gallant sails, royals, studding-sails, alow and aloft, stay-sails, jibs, and "kites" of all kinds. She passes swiftly, with a fresh and free wind, and her form is reflected on the prepared plate about the sixtieth part of a second! yet in this time, almost too short for imagination to define, the passing ship has been pictured on the prepared glass plate. Every rope and every spar—every inch of standing or running rigging—every sail, and every seam in the sail—every patch in the canvas made during the voyage to repair rents—is there distinctly and perfectly represented, and so, too, are the foam flakes at the bow where the sharp cut-water divides the tide, and the ripple at the stern where the surface of the river rolls into little waves, and resolves itself into a far-reaching and visible "wake." Nay, there is the captain leaning over the taff-rail; there is the black cook heaving a bucket of slush over the leeward bulwarks.

It is generally supposed, I believe, that this wonderful process of instantaneous photography requires a peculiar instrument and special chemicals—collodion of extraordinary sensitiveness, and some agents known only to a few of the initiated—but it is not so. The same camera and the same chemicals with which any landscape is taken by the ordinary process of lengthened exposure are adapted to this instantaneous process, and all that is needed is a proper stop, a perforated slide to let slip at the appropriate moment, and a ready eye to see when that

moment has arrived! The chemicals, it is true, must be in perfect order, and then the result will be certain and satisfactory. The lens used on the present occasion was a quarter-sized "Jamin," of four and a half inches focal length, and one and a quarter inch diaphragm. A good portrait lens, with as flat a field as possible, is necessary for success in instantaneous photography. The brief or under exposure of the plate causes the picture to be less brilliant than one longer exposed, but then it imparts a soft and eventide look to the landscape as singular as it is beautiful. No doubt, the professed moonlight pictures are in reality taken in broad day, and pass for moonlight because of this very softness to which we have alluded. On the other hand, many pictures which look like snow scenes, owing to the extreme brilliancy of the lights and depth of shadows, appear such simply because the long exposure has brought up the high lights of the landscape into unnatural vividness.

It seems hardly necessary to say that the instantaneous process has many and great advantages. In writing of the "trials of a photographer," in a previous number of this periodical, I mentioned the danger of having a fine negative ruined by the motion of some animal (a cow, for example), passing across the field of vision, and by the wind which shakes the limbs and leaves of trees, and makes a black ragged mass of blots the substitute for well-defined foliage. These and the like difficulties are all avoided in instantaneous photography. The cow may feed slowly, or walk briskly across the field of vision, and the tree-tops and branches may sway to and fro, but the plate is not marred. The animal is there in act of moving; but all its limbs are sharply rendered, and the very leaf of the trembling aspen is given as distinctly as if it were perfectly motionless, or cut in marble. The clouds, too, which so often disappear and leave a blank sky in ordinary photographs and landscapes are under this instantaneous process perfectly rendered; and we know of nothing more beautiful than the appearance on the negative plate of the grand masses of the majestic "cumuli," or the graceful form of the "scirri," or "curl cloud," travelling across the heavens, and balancing the lower masses of wood, and rock, and spreading water.

The perfect rendering of portrait likenesses, too, we believe will only be accomplished when this process is applied to portrait photography. At present, the constrained position of the sitter, as he waits with head pressing against the iron rest, and eye fixed painfully on some designated object, interferes materially with the success of the operation. A stiff and unnatural look is given to the picture, and the sitter is often dissatisfied with what is really a perfectly correct representation of his face and form as they appeared on the sensitized plate. To catch a person in a natural and easy attitude, with no watchful and strained expression of face, is a great desideratum, and rarely to be secured, we think, without the instantaneous process, which would make it always attainable.

If instantaneous photographs of moving objects can be made with such singular facility and beautiful effects, we do not see why instantaneous photographs may not be made of *stationary* objects from a *moving base;* that is, why a shore may not be caught from the deck of a swift-running steamer—why a continuous panorama of the Hudson or the Rhine might not be executed with facility, and perfect accuracy, and exquisite beauty.

SWAN'S CARBON PICTURES.

WE have received from Mr. Joseph Wilson Swan, Newcastle-on-Tyne, England, a dozen very elegant specimens, from twelve by ten negatives, of his beautiful process. On looking at them, one thinks, surely, the days of silver printing are numbered, if we can secure such lovely and wonderful results as these without its use. It shall no longer make us admire its beauties, and at the same time be preying upon the vitals of what we are made by it to admire, as wine tickles the palate of its victim, while it destroys the whole body.

A portrait of a lady seems to us to be the most successful, though it is the only portrait among them, the rest being landscapes. We have seen many silver prints quite equal,

if not better in most particulars; but ah! they were not permanent, and this is. It possesses many points that charm the artistic taste, and is indeed a triumph of art, skill, and photographic manipulation.

The landscapes are all beautiful; but unfortunately we are not told their localities. They embrace a fine variety of English scenery, such as trees, falls, rocks, mountains, and castles. One view we imagine to be that of Kenilworth Castle. The ivy-clad ruins stand majestically in the distance; in the foreground there is a charming little brooklet, calm and quiet, and a long log-crossing. An old lady seems to have halted there a moment while the picture is being taken, and although old and homely, and evidently humble, she adds much to the effect of it. It is altogether very fine, and we regret that we know nothing more of its history, both photographically and geographically.

It would be a joy to see some of our unrivalled American scenery, such as Watkins's California Views, reproduced by this great and promising process. We have already printed Mr. Swan's process in our Journal; but the following account of "A Visit to Messrs. Mawson & Swan's Carbon Printing Establishment," by our friend and co-worker, Mr. G. Wharton Simpson, will not be found uninteresting. Mr. Simpson travelled six hundred miles to see what he describes, and reiterated what follows, in a private letter to us a short time ago:

"A few days spent in the carbon printing establishment of Messrs. Mawson & Swan, at Newcastle-on-Tyne, have amply convinced us of what we were, from previous examination and experiment, disposed to believe, namely, the thoroughly practical and commercial character of Mr. Swan's carbon printing process. We have also learned that all the manipulations can be carried out, under intelligent superintendence, by women and boys, and that there is not, and need not be, a larger percentage of failures from any cause than inevitably arises in ordinary silver printing. Throughout the operations there is little left to chance; everything proceeds in an orderly, methodical way, leaving little room for failure when certain primary conditions are complied with. It appears to have been Mr. Swan's aim to attain as much completeness as possible in all his arrangements before inviting the public to adopt a new method of printing, in which their former experience with silver printing would avail them but very little.

"The preparation of the 'tissue' is a question which will give the public but little concern, as it will be supplied to them ready for use. This will doubtless be felt a great boon, not simply as saving a troublesome operation, but also securing a degree of excellence and uniformity which would be almost impossible in preparing the paper in small quantities. Messrs. Mawson & Swan prepare this tissue by machinery. A piece of paper twelve feet long is made into an endless band, revolving round rollers, which keep it stretched, and repeatedly pass it over a surface of melted gelatine, sugar, and pigment, until a perfectly even coating of the right thickness is applied to the whole length.

"The trough of gelatine is kept at proper temperature by means of steam. By repeated contact with the gelatine, a thin coating being applied each time it passes over it, a much more perfect surface, and even thickness of the gelatine, is secured than could be obtained by any plan which applied the full thickness at once; and by the constant revolution, until the gelatine is thoroughly set, waves of irregular draining are entirely avoided. It will be obvious that a perfectly even layer of gelatine could scarcely be applied to large surfaces satisfactorily without the suitable machinery which is here provided.

"These lengths of gelatine are then cut up to specific sizes, and will keep *ad infinitum*, ready for sensitizing when required. We understand that a very complete assortment of tints and intensities will be supplied to the public. The various tints we have seen range from an intense, pure black, through the purple tints familiar on silver printing, to a rich sepia tint. These possessed varied intensities, suited to different classes of negatives, some being suited to secure a soft print from the hardest and densest negatives, and others to secure vigor from the weakest of negatives, so that it will be possible, by a simple classification of negatives, numbered in relation to the number of the tis-

sue, to obtain, by a few repeated trials, the best result of which it is capable from almost any negative.

"The actinometer devised by Mr. Swan, and recently described in our columns, is found in practice to answer perfectly, and is sufficiently simple to be prepared and worked by a boy with such ease, as well as complete accuracy, that Mr. Swan remarked, they would prefer to use it for silver printing instead of the old method of repeated examinations of the print itself. Possibly nothing can better suggest the certainty of the operations than the mention of one illustration which came under our own notice. Whilst we were at Newcastle, the first print was taken from one of the largest negatives we have ever seen. This was the copy of a painting containing some hundreds of portraits, and, as will be readily seen, required a degree of minute perfection in every part much greater than would suffice in a picture a large portion of which was background or accessories, a minute defect in which would not readily be noticed. The dimensions of the negative were thirty-two inches by sixteen inches. The first copy ever tried of this picture was printed whilst we were present, being commenced one afternoon, and finished—exposure, development, washing, drying, gelatinizing, transferring, waterproofing, &c.—the next afternoon in time for post. The print, which was one of many others in course of production, was thoroughly good in every way, and pronounced perfect by Mr. Annan, who, in his satisfaction, telegraphed at once to that effect. We mention this case because the first production of a picture so large of a trying subject might easily, in any process, have required two or three trial prints before the best result was obtained, whilst here a print as perfect as could be desired was produced at once in the ordinary routine of operations.

"The transferring, which might readily be supposed to be a delicate and a difficult operation, we found in practice to be exceedingly simple and easy, whether the transfer was made to paper or the mounting-board. The former seems to have the preference at present with Mr. Swan, as it affords an opportunity for effecting the waterproofing, to which we have already adverted. A word or two on this subject may be desirable. When the print is transferred from its temporary basis to a mounting-board, the adhesive material by which it is made to adhere to the board is gelatine; and should the picture, at any future time, be soaked in water, the carbon image might, by hard rubbing, be abraded or removed by the softening of the gelatine by which the adhesion is secured. When the print is transferred to paper, an additional safeguard becomes possible. After the operation of transferring to paper is completed, the picture is plunged into a saturated solution of alum, which renders the gelatine used for mounting insoluble, and secures the highest possible certainty, not simply of permanency, but of immunity from injury by damp, the one cause by which gelatine might be supposed to suffer deterioration.

"In connection with the transfer process there is a very elegant operation to mention. In some instances, Mr. Swan has thought it desirable to add a little of a white pigment to the gelatine with which the transfer is effected, in order to give brilliancy to the whites of the picture, and it is in connection with the mode of doing this that we have to notice an extremely neat method of working. All who have used the eburneum, or similar processes, are aware of the risk, in introducing a white pigment into gelatine, of getting a coarse granular effect. Mr. Swan avoids all chance of this. Instead of introducing an insoluble white pigment into the gelatine, he introduces a soluble material, which can readily be converted into the required pigment. Chloride of barium is dissolved in the gelatine solution without difficulty, leaving it as clear as at first; and with this mixture the transfer is effected. When the print is subsequently immersed in the solution of sulphate of alumina (alum), a decomposition ensues, and the chloride of barium is converted into sulphate of baryta, a pigment of very pure white, which produces the desired end without difficulty.

"The establishment which Messrs. Mawson & Swan have devoted to carbon printing is admirably fitted for the purpose, and will admit of a much more extensive staff of work-people than they have found it desirable, in the experimental stages of the pro-

cess, to employ. The operation of printing some large orders is now steadily progressing, and we have reason to hope that before long all arrangements will be complete for enabling the public to test the advantages of the process."

In a letter from Mr. Swan, accompanying his specimens, he informs us that he intends selling his non-sensitive carbon tissue through the stockdealers in this country, and, also, that a manual of his process will be published very soon.

TURNER'S FORMULÆ.

BY J. H. MORROW.

WHILE in Birmingham, England, I made the acquaintance of Mr. Turner, the eminent photographer of that place, and could not but admire the *beauty of his negatives on glass*, surpassing in beauty of detail, clearness, and the requisites of a good glass negative, any it has been my fortune yet to see. The following is his "*modus operandi:*"

COLLODION.

Cotton, ...	32 grains.
Iodide of potassium, .	10 "
Iodide of cadmium, .	10 "
Bromide of potassium, .	10 "
Bromide of cadmium, .	10 "
Sulphate of ether, . .	5 ounces.
Alcohol, ...	3 "

Dissolve the cotton in the ether; the iodides and bromides in the alcohol. If not all dissolved, warm the bottle before the fire with the stopper out; shake well, and then mix with ether. Allow it to settle four days, after which it will be ready for use. The iodides and bromides should *be pounded fine.*

BATH.

Iodide of potassium to 40 ounces of water, . .	8 grains.
Nitrate of silver, . .	40 "
Distilled water, . .	1 ounce.
Alcohol, . . .	1 "

To make up the bath, put the water and silver in the bottle. When the silver is all dissolved, add the eight grains of iodide of potassium to forty ounces of the bath; shake well, and then add the one ounce of alcohol. Put the bottle in a POT OF WATER (or a saucepan); *leave the cork out of the bottle,* and boil it for six or eight hours. Be careful not to let the water in the pot come up higher than the shoulder or neck of the bottle. When cold, add to each ounce of the bath one drop of pure nitric acid.

DEVELOPER.

Protosulphate of iron, . .	½ ounce.
Nitrate of potash (nitre crystallized),	¼ "
Acetic acid (freeze at 50 degrees),	½ "
Alcohol, ...	1 "

After developing, wash the negative well, and then pour over it a solution of silver, thirty grains to one ounce of water; drain off the silver, and redevelop with the above. Strengthen with bichloride of mercury, four grains to one ounce of water.

FIXING SOLUTION.

Weak cyanide of potassium, gelatine, or gum-arabic in solution, will prevent the intensity being taken out, if desiring to varnish the negative.

As I said before, the beauty of his negatives made a strong impression upon me at the time; but his mode of manipulating deterred me from putting his process into practice. As he never varnished his negatives, and preferred to use them just as they came from the washing, the liability to injury in scratching them while printing or handling, and keeping them safely afterwards, presented a serious obstacle. Nevertheless, I am firmly impressed with the delicate beauty of detail, and softness of gradation, clearness of the shadows, and entire absence of fog, or even an approach to it, as seen in the case of the majority of negatives made daily. The difficulty, I imagine, is that the popular mode of manipulating is considered good enough. In some ways it is, but in nowise approaching the other, which is a thing of beauty, and intense enough withal.

The above process is precisely as practised by Mr. Turner, as I took occasion to try my hand for a week with him (for a consideration), to all of which you are very welcome.

For positives on glass, he used the same bath and collodion:

Iodide of potassium,. .	40 grains.
Ether, ...	5 ounces.
Alcohol, ...	3 "
Gun-cotton, . . .	32 grains.

DEVELOPER.

Protosulphate of iron,	.	240 grains.
Nitrate of potash,	. .	160 "
Alcohol,	. . . .	2 ounces.
Formic acid,	. . .	1 "
Water,	. . . .	20 "

SUTTON'S TUNNEL LIGHT.

Not being a writer, or the son of a writer, I cannot spin you a fine story; but having seen your many published plans of "lights photographic," and the several opinions expressed of the total failure of the Sutton or tunnel plan, with your desire to see some work made in them, I send you a few specimens of the real Simon Pure made in the tunnel light, with a print of the worst side of the light.

The side-light is six feet square, using lights of glass twelve by eighteen inches. The top-light is two feet by eight, and glass of same size; east top-lights covered by corner of the upright. I do not brag of the quality of the work, for I am out of the business, having quit last March and done nothing since but this, which I went into the gallery of a friend and did, to show you the effects of light. The prints are of customers as they came in, and I made the negatives. I inclose you several prints, which speak for themselves. I have succeeded better than I thought I could, and would like to hear your comments thereon.

E. H. Alley.

Moravia, N. Y.

[The prints sent by Mr. Alley certainly speak very well for the tunnel plan. They are good; and, as we have before said, when there is plenty of light, no large buildings or other obstructions near, and the weather bright, the tunnel plan works well. Since receiving the above, Mr. Alley has sent us the following additional remarks:]

As you speak so well of the prints I sent you made by the Sutton or tunnel light, I thought I would write you once more concerning them. They were made by silvering on plain solution, about eighty grains to the ounce (not fumed), toned with simple acetate of soda and chloride of gold.

Now a little more about light. It is very important, as you say, to have good light, but *more important to know how to use it.* Just as poor pictures can be made by this same Sutton light as by any other. I happened to meet Mr. Notman a few weeks since; and as many of your readers are anxious to get at the "*secrets*" of great operators, which they are "*keeping back*," perhaps I may speak of his. Although you have published it, it may bear repetition partly. His process is, as near as may be, like every other good operator's; but as to the *secret*, it is this. He is an *artist*, brought up in the art schools of England, painted pictures for sale, made art his study, and is to-day a student of light and shade. He knows what he wants to do, and does it with what he can. He has some of the finest steel engravings, and tries to produce their beautiful half-tones in his photographs. He takes more care and time in posing his sitter and arranging accessories than any other man I have met. Mr. Sellers says to an "engineer" "to take an engine, use an old collodion, and give plenty of time to bring out the details." That is Mr. Notman's plan. He imports his collodion from England, and buys Anthony's dry collodion in New York; dry for large plates, and mixes for cards. He uses no new, but old always, as, you see, it cannot be new when it reaches him from England. He has embraced your friend, "Fidelity," as a pet; and as I have told *his secret*, everybody and his neighbor can tell how to make fine work. First, get an artist's head on your shoulders; then, with an artist's eye, see your model properly lighted, whether you have a Silvy, Sutton, Robinson, or Notman studio, or, to repeat, *know what you want to do, and do it with what you can.* The editor of "The Photographic News" has said, several of the best operators in England have poorly arranged lights; but knowing their business—*i. e.*, being artists—they manage to make it do their bidding, as it were, and produce uniformly superior work.

[Mr. Alley's excellent remarks are worthy of most cordial indorsement. Making pictures is like making bread or cake. Give the same recipe and the same instructions to two ladies, and one will produce heavy and sour bread or cake, while the other will

produce that which is light and good. *It is in the head and hands, gentlemen*—in the head and hands, and not in the process. Have a purpose, and then with brains and fingers work it out.—Ed.]

PHOTOGRAPHY AMONG THE INDIANS.*

No. 2.

Fort Philip Kearney,
Montana Terr., July 29, 1866.

No doubt, dear Journal, you received my last, dated at Fort Laramie. As I told you, I there saw the lazy, sleepy red man treating for peace and friendship. He has since appeared to me as the active, wide-awake savage in the war-path, and made me think of two lines of an old song:

> "Then you have Indian allies—you styled them by that name—
> Until they turned the tomahawk, and savages became."

For it is when the Indian scents blood that he becomes really and truly a savage, or, rather, the savage gets on the outside of him, and becomes visible to the naked eye. I left Fort Laramie on the 13th of July, and joined one of Col. Carrington's trains, under command of Lieut. Templeton, and composed of six other officers, the post-chaplain, Mr. White, ten privates, nine drivers, three women, five children, and *the photographer*, of course.

We had very little scenery worth photographing until we crossed the Platte at Buyer's Ferry, fifty-three miles from Fort Laramie. Eighteen miles further up, I made a stereoscope view of the river, and bade it farewell. After three days' travel over a barren and loamy section, we reached Fort Reno. The next day we travelled twenty-five miles further to Crazy Woman's Fork, where our commander and Lieut. Daniels were surprised by Indians while hunting a camping-ground. Lieut. Templeton came in without his hat, with a string of Indians on ponies after him, while poor Daniels was killed. Our men with their rifles held the Indians at bay until we reached a better position on a hill, where we kept them off until night, when Capt. Burroughs, formerly of Philadelphia, coming up with a train, caused the red-skins to retreat. They looked very wild and savage-like while galloping around us; and I desired to make some instantaneous views, but our commander ordered me not to, as he expected an attack at any time.

Capt. Burroughs took us back to Fort Reno, where we buried Lieut. Daniels, loaded stores, and, being joined by two other trains, started again. We reached Clear Creek, twenty miles beyond Crazy Woman's Fork, unmolested. I made a picture of the battle-ground. At Clear Creek the Cheyennes came into camp; but my collodion was too hot, and my bath too full of alcohol, to get any pictures of them, though I tried hard. They attacked our train in the rear, killed two of the privates, and lost two of their number.

The next day we arrived here, at the base of a mountain whose summit is surrounded perpetually with a wreath of purest snow. I am surrounded by beautiful scenery, and hemmed in by yelling savages, who are surprising and killing some one every day. I expect to get some good pictures here, and hope that before Christmas you will see how these mountains look in July. I hope my next letter will be more interesting photographically. Until then,

Photographically yours,
Ridgway Glover.

* Mr. Glover's letter was too late for our last issue.—Ed.

PAPER COLLODION.

[Translated and abridged from Liesegang's "Archiv" for *The Philadelphia Photographer*.]

Large quantities of pyro-paper have been prepared and used at the Elberfeld photographic establishment with the best results. The following are some of the trials made:

1. Flax was dipped in a mixture of equal volumes of sulphuric acid of 1.6, and nitric of 1.4 and 5, and left ten minutes. It dissolved almost completely in four parts alcohol and two ether.

2. Silk paper in same mixture.

3. White blotting-paper was left over night in the same mixture. Like the two

former, it dissolved freely; gave, however, a much thinner collodion than the silk paper.

The three collodions were iodized with lithia. The silk paper gave the finest and strongest negatives, and worked the fastest.

4. Thirty grammes (one ounce) silk paper were cut up and placed in a mixture of 250 grammes ($8\frac{1}{3}$ fluid ounces) of nitric acid of 1.4, and the same quantity of sulphuric of 66°, and were left fifteen minutes. In the same mixture half as much paper was placed, and left half an hour; the rest for six days. All these portions dissolved perfectly in the ether-alcohol.

5. Eight ounces of silk paper were cut up and placed in a mixture of nitric acid, 1.4, and sulphuric acid, each sixty-four fluid ounces, and taken out after twelve hours. Dissolved to an almost completely clear solution in ether-alcohol.

Liesegang states the advantages as follows:

The whole operation is easier and more certain. The paper needs no preparation but slitting up; it needs no working in the liquid; washes and dries easily.

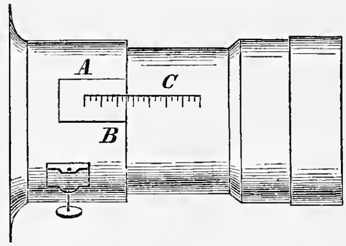
The paper collodion is very fluid, has little tendency to clouding; gives a very even film; shows no tendency to change by keeping.

Its greater fluidity specially adapts it to mix with chloride of silver as in the collodio-chloride process.

Finally, it is less costly. The mixture can be used over again, and in this case the paper is left in till a sample dissolves completely (after washing and drying) in ether-alcohol. L.

FOCUSSING SEPARATED OBJECTS.

THE recent suggestions of M. Claudet, in reference to focussing upon, or, rather, by mechanical means bringing widely separated objects into focus, reminded me of some experiments of my own, as long ago as 1852–3. I had engraved upon the inner slide of my camera-tube a graduated scale, illustrated by the accompanying diagram. A piece of the outer portion of the base of the tube was cut out, as at A, and a piece of clear glass inserted so that the scale C could be seen on both sides of the line B. This line B marked upon the scale the points focussed, and the operator, by means of the



rack and pinion, could bring each point alternately under this line during the exposure. Some of the groups I made by this means, were quite remarkable. I, however, found that there was great liability to a general blurring of the image, from other unavoidable movements of the camera, scarcely to be prevented when it was supported by any of the stands then in use.

I adopted the plan of giving the tube a very rapid motion between the two points focussed; and for the better purpose of securing this rapid motion, as well as to secure greater accuracy, I had planned an arrangement, first, for securing the camera in a firm solid framework, and next, attaching a weight, by means of a clockwork, to the tube, which, by being "tripped" at the moment of exposure and suffered to run down, would give the tube a rapid motion between any two points indicated upon the scale. The idea was also entertained of giving this motion to the *rear* lenses of the combination alone, and I only gave up these experiments at the time, because I did not feel able to *realize* the plan for a clockwork attachment, and afterwards becoming involved in other business operations, it was given up entirely, and not since thought of, until the recent articles upon the subject in the British photographic journals have revived my recollection of these by-gone experiments.

One of the pictures I took at the time, was a group of two persons, one reclining upon a lounge very much foreshortened; the second one standing behind and leaning over the lounge. In the rear of the group, at a distance of some five or six feet, was a small oil-painting hanging upon the wall.

I focussed upon the two extreme points, viz., upon the little picture, and upon the feet of the reclining figure, which were the *nearest* points.

During the exposure I moved the tube as rapidly as I could, by means of the "rack and pinion," between these two points. The result was a picture remarkable, as regarded the true relation of parts, and even the little picture upon the wall could be distinctly made out, but there was a general blurring from causes above indicated, and also, probably, from the constant increase and diminution of the objects in the picture, unavoidable in such a movement of the tube, but which difficulties I hoped to overcome by the rapidity of the movement proposed to be communicated by means of the clock-work, and by securing the camera in a perfectly firm position. It is, manifestly, not a very plausible-looking theory, and a practical test might prove it to be entirely erroneous, but the success I met with was so encouraging, that my faith was strengthened that very remarkable pictures might be produced by such means, modified to suit unavoidable exigencies; and I still have faith that something really valuable and *practical* will grow out of the recent suggestions of M. Claudet.

Very truly, yours,

V. M. Griswold.

Peekskill, N. Y., Sept. 27, 1866.

Mr. Griswold alludes to the paper read before the late meeting of the British Association at Nottingham, England, by M. Claudet, "On equalizing the definition of all the planes of a solid figure, represented in a photographic image." It is exceeding long. The chief suggestion of M. Claudet will be found in the following extract from his paper:

"Perfection in the portrait would be attained—were it possible to do so—first, by taking the image of the nose; then, after having altered the focus, the image of the eyes; and finally, after again altering the focus, the image of the ear; and then, from these various images, forming a collective portrait. Such an idea may appear impracticable, possibly even absurd, and it is sure on first thoughts to be rejected and condemned. Yet I seriously, and after mature consideration, both of the practice and of the theory of such a scheme, propose its adoption as one of the greatest improvements which will have been introduced in photography since its discovery. Now, if during the operation, we bring nearer or further the two lenses, by this simple means we adapt the focus of every plane to the immovable frame holding the plate; and we are enabled thus to represent consecutively on the plate an image of every plane, with a less reduction or increase of size than when the power of the double combination remains the same; for it happens, fortunately, that, to reduce the focus, we must separate the lenses, by which the power is increased. The alteration of the distance which separates the two lenses, is effected by a rack and pinion acting upon a tube containing the back lens, that tube sliding into another containing the front lens, which remains fixed during the adaptation of the focus to the distance of every plane by means of a gradual movement communicated to the back lens during the sitting."

That M. Claudet is *aiming* in the right direction, we will all admit, but his plan does not seem strictly orthodox. The subject has been discussed at great length in our English contemporaries, but very few experiments are reported. One correspondent suggests, that changing the size of the stops during the exposure, will produce the desired sharpness all over the figure. The subject is a very interesting one for study, and M. Claudet at least deserves credit for his pluck in bringing it up afresh. We trust that it will amount to more than did the peroxide of hydrogen *canard*.

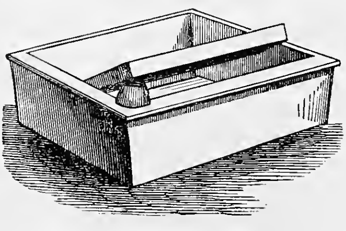
COAGULATING ALBUMEN PAPER.

Editor Philadelphia Photographer:

In a late number of *The Photographer*, I saw a few words in regard to the coagulating of albumen-paper by the use of alcohol. It occurred to me that, at the present price of alcohol, it must be rather an expensive business; and as I have had some experience in the matter, I send an account of it for the edification of your subscribers. For some years I have practised coagulating my

paper previous to silvering. In relying upon the silvering to coagulate the albumen surface, we only get a partial coagulation, unless the silver solution is very strong. By using a strong silver solution, say eighty grains to the ounce, the coagulation is more thorough; but more free silver is left on the surface of the sheet when it is dried and fumed, and as free silver is injurious to its keeping qualities, it is not advisable to use it if a less amount will answer. I, therefore, early devised a method of rendering the coagulation complete first, and then silvering with a weaker solution. There have been various ways devised by different persons to coagulate the albumen surface for photographic purposes; most of these, it seems to me, do not reflect much credit on the ingenuity of their authors. To coagulate the albumen thoroughly considerable heat is needed, and, further than this, it should be continued for some time; it cannot be done instantaneously. The first plan which I used was to take a tin cylinder or deep cup, and roll the sheets and put them into it; after pressing the cover on tightly, place the cup in boiling water, having the water to come nearly to the top; keep the water boiling hot, and let the paper remain until coagulated, perhaps fifteen minutes.

Although this method did tolerably well, it still was not as thorough as I desired. I, therefore, had an oblong pan made large enough to take the size paper I used; then I had another pan made two inches larger each way than the first, and one inch deeper. The two were then soldered together, the smaller inside the larger, so as to leave an inch space between the two for boiling water. This space being filled with boiling



water, it is placed on a stove where it will continue to boil rapidly. The sheets are placed in the upper pan, and a freestone one and a half inches thick, which has been previously heated as hot as one can bear the hand upon it without blistering, is placed upon it. The weight of the freestone compresses the sheets together; and between the boiling water beneath, and the hot freestone above, the albumen has no chance to escape thorough coagulation. Keep the water at the boiling point, and let the sheets remain fifteen minutes; then raise the stone, and turn the sheets over. Replace the stone, and let them remain fifteen minutes longer. It is an old adage that "the longer you cook an egg the harder it grows;" so, the longer the heat is continued the more thorough will be the coagulation. Three to five hundred thicknesses of paper can be put in at a time, the whole mass heating entirely through. In coagulating paper in this manner, the great degree of long-continued heat drives the fermented acid in the sizing and albumen entirely through the fibres of the paper, so that if silvered in the state in which it comes from the heater, it will turn yellow and spoil in a short time; it should, therefore, be treated in the manner described on page 296 of the present volume of this Journal. By neutralizing the acid in the manner described, then, it works without trouble, although it will not keep probably quite as long as that which has not been heated. It is necessary to use more ammonia in the silver bath than usual. I use sufficient ammonia with the plain silver solution to admit of silvering in about one and a half minutes. The albumen is coagulated too hard to allow of using a plain solution alone. If, on removing the paper from the bath, it drains off, leaving a greasy-looking surface, with drops of solution standing here and there on it, it is evidence that there is not ammonia enough in the bath to allow the silver to penetrate the albumen.

First, however, rub the surface of the paper with cotton flannel or cotton-wool, as directed on page 297 of this Journal; if that does not cure it, add *ammonio-nitrate* solution to the bath until it does. After silvering, fume or not, as you choose. The surface is not easily abraded after coagulation, and will admit of a smart rubbing to remove the animal oil on it. Sometimes I silver the paper by rubbing the solution

on with a tuft of cotton, and have produced good results in this way.

This pan which I have described is useful for other purposes than coagulating paper. With a tin cover, which I often use, it answers to coagulate the albumen used on porcelain plates. After the plate is coated and dried, lay it, back down, on the bottom of the pan; cover it up, and let it lay a few minutes. Blistering never occurs after this. Many persons coat their negative glass with albumen before using; these can be coagulated in the same way. The heat drives off anything that would be likely to injure the bath.

There is some complaint of the fading of porcelain pictures; there is no doubt that they do fade. The method of making them is such that any one acquainted with the nature of the materials used in making them might have anticipated such a result. The albumen coating used on these plates is an animal substance. All animal matter is subject to decomposition and decay; albumen is not an exception unless thoroughly coagulated. The immersion of an albumen surface in a fifty-grain solution of silver only partially coagulates it. Now, if immersion in a fifty-grain solution only partially coagulates it, how much less will it be coagulated by pouring on a coating of silvered collodion, containing not more than five or six grains to the ounce, not of silver, but of chloride of silver? Pictures made on albumen so slightly coagulated as this must be cannot help but fade, as the uncoagulated coating of albumen soon begins to decompose and decay, and shortly destroys the picture.

Coagulate your albumen surface as thoroughly as it should be before you coat it with collodion, and there is no reason to apprehend any more danger of their fading than any other sun picture. In coagulating albumen by great heat, objectionable matter is driven off, which is retained and sealed in by coagulating with silver.

If you have not a tin apparatus for coagulating your plates, place a freestone, one and a half or two inches thick, on your stove. Heat it as hot as you can without scorching a sheet of white tissue-paper, which you will keep on it. Lay your plates, back down, on this for a few minutes, and the surface will coagulate to your heart's content. By having another similar stone heated to place over the first one, paper may be coagulated in this manner; but there is more danger of giving it a brown tinge, not desirable.

There is a great field of undiscovered possible uses to which albumen may be put when its treatment has become better understood. I fancy that it may yet attain to an importance, and play a part, not yet dreamed of at this time by our fraternity.

Truly yours,

F. B. Gage.

St. Johnsbury, Vt., Oct. 8, 1866.

A DAY WITH THE CAMERA.

On a bright morning in September, our party, consisting of four, started out to take some views near Kilbourn City, Wisconsin. Our first destination was the Dalles of the Wisconsin River; to reach these we drove about three miles through a beautifully wooded and hilly country; the roads were a *little* rough we thought, as we came every little while to a rut six or eight inches deep, into which the wheels would plunge, an operation particularly pleasant to us ladies, as we occupied the back seat, and had between us, a wooden box about fourteen inches square, containing chemicals, glass, &c., and in front of us, between our knees and the forward seat, the dark tent; this occupied nearly the entire width of the carriage, was as high as the seat and five inches deep, so that we had to sit well back and look out for our feet, as the box was not very careful where it came down when we bounced. Arriving at the Dalles we found they were indeed worth seeing; the river there is very deep and winds its way between huge perpendicular rocks, which form a solid wall, some sixty or seventy feet high on either hand. The action of the water has worn these rocks so, that instead of being a straight wall, they are rounded into huge rough columns, standing on both banks of the river.

After setting up the camera the gentlemen went back a short distance to get ready their plate, when our driver, being of an in-

quiring turn of mind, went to inspecting it. I was admiring the scenery, when I heard an exclamation of horror from my companion, "Oh! the camera has gone over!" sure enough, it not having a very steady footing, by some incautious movement he had upset it. We rushed forward and picked it up from the edge of the rock; a few more inches would have sent it down into the river. We were examining the ground glass, when a little, metallic, clinking sound caused us to turn just in time to see one of the *stops* roll over the rock, and vault into the depths below; no hope of recovering it, as the surface of the water was thirty feet below us, and the river sixty feet deep, so we gave it up for lost, and turning again to our camera were rejoiced to find no other material damage done. Soon the plate was coated and a view taken. Pending further operations we strolled up the bank, and had gone some distance, when we heard our names shouted vociferously; showing ourselves on a sandbank which projected out into the water, we were informed that a view was about to be taken, and it was desired to introduce our figures. Not feeling inclined to retrace our steps so soon, we asked if we could not be taken where we were. After a squint through the camera at us we received the direction, "Go up on that rock beyond you;" this was a large rock that jutted out far above our heads. After much toil and difficulty we reached the eminence, and after changing our positions a dozen times or more according to orders, we thought we were at last fixed to suit them, when what was our indignation, as we were motioned and told to "go back on that sandbank." We at first felt inclined to rebel, but on second thought obeyed (being married), and clambering down from the height, which we had risked our necks to climb at their lordships' behest, regained the sandbank, and after numerous other directions were satisfactorily *posed* and *taken.*

After taking a few more views we returned to Kilbourn, and I thought as we rode back, how little I had understood, as I sat in my pleasant parlor and admired my stereoscopic views, of the trouble and labor which had been expended upon them. How often, when looking at some figure perched picturesquely on some lofty eminence, had I said, "How *did* they ever get up there?" now, I have some idea *how.*

On our return to Kilbourn we partook of a hasty dinner, and then started off again to go seventeen miles in another direction, where we were told there was a very beautiful lake. They called it "Devil's Lake," but we re-named it Spirit Lake. Such a drive as we had now; the road to the Dalles was smooth in comparison; in some places the sand was so deep that the horses could hardly get along, and in others we clambered up steep narrow roads where there was only room for one vehicle; in two such places we encountered another carriage, and were obliged to get out and lead our horses close to the edge, and barely escaped upsetting. After bearing innumerable joltings, our carriage at last broke down; fortunately we were near a village, so we obtained another vehicle, left our own to be mended by the time we returned, and drove on in haste, as the hours were fleeting; when we reached the lake we found it was rather late for making a favorable view, nevertheless we took one for our private satisfaction. Spirit Lake has no visible outlet, and is one of the wildest and most romantic spots I ever beheld. It is in shape, a narrow triangle; the two longest sides are tall bluffs covered with trees and immense rocks, scattered about in the utmost confusion; it looked exactly as if some giants had engaged in conflict, and hurled these rocks at each other from opposite sides of the lake; the third and shortest side, is a narrow sandy beach, from which the forest extends for some miles. They told us a sad tradition of an Indian maiden whose lover fell from the rocks, and was dashed to pieces. Upon viewing his mangled remains she cast herself into the lake, and their spirits, we were told, still haunt the shores.

The waters were very rough, and rolled and dashed upon the beach like a mimic ocean, and as we sat and gazed, the towering bluffs, the profusion of rocks, the tossing waters gave it a weird charm which sank deep into our heart, and we felt it was well named Spirit Lake. K. H. W.

WE issue thirty-four pages this month.

PHOTOGRAPHIC NOVELTIES IN GERMANY.

Photography and War—Marginal Decorations of Photographs—Experiments on the Qualities of Lenses.

BERLIN, September 29, 1866.

DEAR SIR: Peace has been made. The war, which threatened to be a new thirty years' war, has been terminated in as many days, to the surprise of the whole of Europe, nay, perhaps, of all the world. Two excellent painters, *Bleibtreu* and *Camphausen*, accompanied the army; artists were present as reporters for illustrated papers, and even photographers are said to have been on the theatre of war. According to inquiries made, many photographers had, indeed, the intention of following the army: most of them, however, could not proceed farther than the limits of the Prussian kingdom. Our army advancing with such rapidity, or (to use an expression of the opposite side), with such an "apish agility," and the means of transport being so insufficient (for almost all, that could be procured, was required for military purposes), it was almost impossible for a private photographer to follow it. At an enormous expense Mr. Henry Graf, two years ago, made a fine album of the theatre of war in Schleswig and Holstein. The first prints of this were scarcely published, ere they were copied by clandestine photographers, who deprived the author of the profit of his costly work. Recently, the consequences of the defencelessness of photography appeared in a most striking manner. Immediately after its termination, Mr. Stiehm visited the theatre of war, and procured some hundred plates, whose publication he delays, in order not to risk piratical copying, and he intends to sell them by way of subscription. In consequence of these circumstances, till now, not a single photograph of the theatre of war has been issued, and previously, we have no better remembrance of this glorious campaign than awful images, colored up with indigo and cinnabar.

Significant, however, is the evident importance of photolithography in this campaign. The movements of an army require the most exact local knowledge of the enemy's country, only attainable by maps. But these exist only in a very small number, because of the difficulty encountered in securing them. On that occasion photolithography offered an excellent means for making by one single map a true fac-simile, enlarged or diminished, and for multiplying it to many thousands of copies, which were sent to the advancing army, and distributed among the officers.

The performance of this task was conferred upon the establishment of Burkhardt Brothers, and it was the more difficult on account of the rapid advancement of our army, making the execution of all work most pressing. During the campaign the presses were worked day and night, and the number of the maps thus produced amounted to 96,000. The extraordinary speedy termination of the combat frustrated a project, formed at the very beginning of the war, viz., *taking views of the occupied countries by means of photography* for trigonometrical purposes. I have explained to you the principles of this proceeding in my essay on the panoramical apparatus. The necessary apparatus were, however, not yet finished when the war began. The War Office has resolved upon the performance of the affair being yet accomplished.

The events of this time have induced some photographers to reintroduce a series of ancient portraits of our generals, provided with a *new peculiar marginal decoration*. Thus, we find busts of the King and of the generals environed by a photographed garland of laurels. The first images of this kind were made extremely rough. A natural crown of laurels with white background was photographed and copied, and to the finished copy, the bust, separately copied, was then mounted. Now, this is made in a more simple manner. First, the bust is copied *à la vignette*, so that the margin remains white, and then the same paper, together with the negative of the marginal decoration, is exposed, and the latter copied on it.

If the person may be covered (which is not always possible), it is very easy to make the portrait and the decoration on the same plate. Either the person is placed behind *a frame*, inclosing the decoration, or first the bust of the person is taken alone by placing a suitable stop before the plate, and

then on the same plate the decoration (garlands or similar), which, for this purpose, has been fastened to a frame covered with black velvet. The stop before the plate is removed previously, and at last portrait and decoration are developed at once. Precaution is necessary to avoid fogging in the middle of the plate.

A third way of making such decorations is the following one: Take a filigree pattern of thin black paper, like the well-known fine paper screens for lamps, cut it suitably, and put it during copying between the paper and the negative. By these different ways a long series of nice decorations may be provided for, which will please not only old generals, but also fine young ladies.

In the course of the last summer, remarkable progress has been made in photographic optics. You have certainly heard of Dallmeyer's new triple lens for portraits, which has an extraordinary angle of view and great actinic power. I have seen the proofs, and found them admirable. But I have not yet succeeded in getting an instrument for examination.

In connection with this progress in optics, some remarks on the quality of the ordinary lenses, used in practice, are of importance. Your countryman, Mr. Shepard, has the credit of having made the first comparative examination of this matter.

Of late I examined a number of instruments used at this place, and I describe to you my method of examination, which, it is true, is not so exact as Mr. Shepard's, but which is sufficient for photographers, and may be executed easily by every one.

The objectives were fastened to a large camera, and directed to a tower of five hundred feet distant (in the foreground there was the front of the Royal Academy for Industry); then an image was made on a large plate.

On this plate the circle of light was distinctly visible; the centre was stated, and the radius exactly measured; this was the base for fixing the angle of view. (Exactly measuring the circle of light is somewhat difficult, its outlines being not quite sharp. Errors of one millimetre are therefore possible, but they alter the result only for some minutes.) Then the height of the tower in the image was measured from plate to top, and compared with the height of the same object on a plate taken previously by Voigtlander's landscape lens; the focal lengths are to each other as the respective measures, and the focal length of one lens may be fixed, if that of the other be known. (The focal distance of Voigtlander's simple lens was measured by exactly measuring the distance of the focussing screens from the lens.) Instance: The focal length of Voigtlander's lens was 330 mm.; the height of the tower in the image thereby made 24.5 mm.; the height of the tower on the plate taken with Dallmeyer's wide-angle lens 13.75 mm. There is: $24.5 : 13.75 = 330 : x$, whence results $x = 185.2$ mm.

In a similar manner the focal distances of other objectives were fixed. The semi-diameter of the circle of light divided by the focal length thus obtained gives the tangent of half the visual angle, which was searched for in the table of tangents and doubled, whence the visual angle was obtained.

These determinations are easily to be made; more difficult, however, is the determination of the largest picture. Herewith the experimental plates must be compared very exactly, in order to notice in what manner the sharpness decreases towards the margin. It is most important that in taking the plates, they were focussed in exactly the same way, and occupied the same position. The result becomes more favorable, if the lens, as recommended by Dallmeyer, is not focussed on the middle, but on a point distant from the middle by one-third of the length of picture. The judgments on the sufficiency of sharpness will differ according to the individual point of view, and harmony will be, therefore, difficult. Even the objects must be taken into consideration; when, for judging of the sharpness of the picture, there is aimed to a front of a house or to a drawing, a smaller image results than when a court-yard or a perspective of streets is focussed, where the foreground approaches at the sides, and becomes more sharp. The diameter of stop must also be considered, if different objectives are to be compared with each other; the diameter alone of the stop admits no criticism, but only the proportion of the stop and the focal

length. In our experiments the front of buildings, situated opposite to the apparatus, served for judging of the sharpness, after having sharply aimed to the middle of the visual angle. The size of picture thus obtained may be, therefore, considered as the minimum. Those instruments allowed, indeed, making much greater images, when they were directed to a perspective of streets.

Fixing the size of picture to parts of millimetres is, therefore, useless. After having marked the limits of useful sharpness, we then measured its distance from the middle of the visual angle on the experimental plate, divided it by the focal length, and thus obtained the tangent of half the angle of the largest picture, whence, by means of a trigonometrical table, the angle of image itself was easily fixed.

The following results were obtained:

LENSES.	Focal length. Millimetres.	Angle of view.	Angle of picture fit for use.	Size of stop divided by focal distance.
Voigtlander's landscape lens,	330	62° 15′	33° 45′	0.0303
Dallmeyer's wide-angle lens, No. 1,	185.2	71° 5′	54° 30′	0.0260
Busch's triple lens,	363	62°	47° 40′	0.0193
Dallmeyer's triple lens, No. 1,	208	70° 40′	44° 30′	0.0277

We see by this table, that Dallmeyer's wide-angle lens, though its visual angle be almost equal to that of a No. 1 triple lens, surpasses it in useful field of picture by nearly 10°, when the folding screens are almost equal. Also, we remark, the small angle of sight of Busch's triple lens, when compared to Dallmeyer's triple lens. Nevertheless, the useful angle of image is larger with the Busch lens, which may be explained by the smaller stop being used.

Hence results, how much the proportion, size of stop, and focal distance is to be taken into consideration, if an authentic judgment of the lens's performance is to be obtained. But, with the numbers above-mentioned, the qualities of lenses are not sufficiently described. One of the most important points, the actinic power, is wholly neglected; also another point, the brilliancy of picture obtained with the different combinations. It is much to be regretted, that we have not the means for measuring exactly the actinic power. We can judge only of this point in working with the different lenses under the same circumstances, and in my practice I have found, that from all lenses above-mentioned, the Dallmeyer wide-angle lens, in regard to brilliancy of picture and actinic power, is the most excellent. Therefore, I use it oftener with great satisfaction for landscapes and interiors. The little curvature is not important.

Yours, very truly,

DR. H. VOGEL.

MAGNESIUM SILVER SOLUTION.

MESSRS. EDITORS: Please find inclosed a formula for working a 25-grain silver solution for albumen paper. It is now used by several leading establishments in this city. Its superiority over all other formulæ is as follows: 1st. Its great RAPIDITY in printing; 2d. In the *small quantity* of silver used; 3d. The silvered paper does not *redden* at any stage of the manipulations.

Mix in the following order:

Water, ...	1 ounce.
Nitrate of magnesium, .	25 grains.
Nitrate of potassium, .	25 "
Nitrate of silver, . .	25 "
Acetate of lead, . .	5 "

After the above is well shaken, place the solution in the sun for three hours; then filter. It is now ready for use.

Float the albumen paper on the solution from 30 to 60 seconds. Time the floating of the paper according to the weather, hot and damp weather requiring less time than cold or dry weather.

The prints are improved by fuming the paper. Tungstate of soda is preferred to acetate of soda for the toning solution.

J. H. NEWTON.

NEW YORK, October 8th, 1866.

LECTURE ON PHOTOGRAPHY.

BY COLEMAN SELLERS.

Third Lecture—Continued.

Aqua Ammonia in its concentrated form, should be kept in a cool place, and opened with great care, for accidents may occur by a portion being thrown out in opening. Some years ago, on opening a bottle, although I was careful, the expansion was so violent when the stopper started, that it flew out of my fingers. Nearly all of the liquid escaped from the bottle, and the gas quite filled the room; it was almost stifling. If it had gone into my face it would have produced a serious accident. The proper way is to put the bottle into ice water; remove all the sealing-wax from around the stopper with a knife; cover the stopper with a loose bag of India-rubber, tied around the neck. Hold the finger on the stopper, then, by a very little tap on the India-rubber cloth, loosen it in that way and gradually work the stopper out, tapping it with a piece of wood if need be, then, by untying this cloth and carefully removing the stopper, you can have it opened without accident. I have alluded heretofore to the process for making prints by chloride of silver. Paper prints are being made by another process, into which silver does not enter at all. I have here one sample of such a print. It is what is known as the carbon process. And if I have time during this lecture, I will explain it. This is the latest novelty connected with the photographic art. The ammonia I am using is so very strong that when I put my hand into the fuming box, it acts upon the skin, producing a lively tingling sensation like a blister. The printing is managed in this manner: The negative is placed in a frame called a printing-frame, adapted to the size of the negative. I have here what is called a stereoscopic negative. These are two pictures taken at a slightly different angle of view. Now to print, the paper, silvered and fumed, is cut to the size of the negative. In this negative, the side I show you is the glass side; the other, this one, is the negative side, *i. e.*, the side upon which the picture has been impressed. The negative must be laid in the printing-frame with the glass side down. The paper must be placed with its silvered side in close contact with the negative side of the glass; some soft cloth placed on the back of the paper, then the shutter of the printing-frame being put in place, it is held firmly down by spring-catches.

In that condition, they are placed in the sunlight, and actinism then passes through the glass and acts upon the paper. You observe that some portions look whiter than others; those are the parts where the film is the most transparent, and you see the paper through it. Actinism will pass, and act upon it to blacken it. Those parts would gradually grow blacker. Now, it would be desirable to know to what extent it has printed; therefore, the back of the printing-frame is made in two parts. You observe the hinges in the middle. You can raise a portion of the frame, lift up the end of the paper, and look at the print, while the other part still holds it in contact with the glass, preventing the slipping about of the paper, for you know if we were to allow it to slip out of its place, there would be produced another image, partially overlapping the first, rendering the picture useless. Th n this is so arranged that we can examine into the progress of the printing without the fear of such a mishap, and also to see if one part is "cooking" more than another; if it should be, we can cover that part up, or, if need be, expose it more thoroughly to the light. The frames usually made now are provided with an arrangement whereby four pictures can be printed at once, and in one frame. Here we have a larger one, so as to accommodate a larger negative.

I have selected a negative of the skating park, one which would print easier by the magnesium light, being more transparent. I place the paper in contact with the collodion side of the negative; then back it with a cloth pad on the back of the printing-frame, so. In that condition, the sensitive side of the paper is pressed firmly in contact with the collodion side of the glass. To print it, we will use the magnesium light. I am holding it very closely in contact with the light, because the chloride of silver is not nearly so sensitive as the iodide or bromide of silver, as was seen in the experiment last week, and we must make use of all the light we

can get. Now, while my assistant is putting in some more tapers, I will open the back and show you the progrέss of the print. You will readily see that it is not so light as it was. You see already a faint image upon the paper. The paper is now restored to its place for another exposure to light. I do not intend to print the picture as deeply as would be required to make a good print. I merely show you how the process is conducted, substituting the magnesium light for the ordinary sunlight. Now, you see, it is decidedly darker. (*Applause.*) Now, this is the blackening of which I spoke by the exposure to light in making the negative—a very short exposure. In fact, an instantaneous exposure would produce too violent an effect, so that when treated with iron afterward, we should find we had admitted too much light. But the chloride of silver is not so sensitive as the iodide or bromide.

Now we have printed sufficiently to show you the picture; it is almost as dark as it should be. In this condition, if we were to continue the other processes needed to complete the picture, the image would nearly fade away. In practice, it is necessary to print a good deal darker than we want the picture to be, until there is a metallic look to the shadows on the paper. I had a number of prints made to-day to show you how dark they should be printed. These are some by Mr. Hemphill, being a part of his day's work, his business being that of photographing machinery. The free nitrate of silver on the print, which was needed to produce the image, is injurious to the after processes, and it must be removed by washing with water. These prints, which you see here now, have been treated precisely as the one printed this evening. From fifteen to twenty minutes is the usual time for washing off the free nitrate of silver.

Here we have the two kinds of paper, the plain and albumenized. You can all probably see a slight difference in the color of the picture. Now, if any one of these pictures in its present condition was exposed to ordinary daylight, the same influence which made the picture would continue, and the paper would blacken all over; therefore, we have to do something to them which would render them permanent. This is effected by dissolving out all the unreduced chloride of silver by the use of the hyposulphite of soda. Place a print of this kind in this solution of hyposulphite of soda, and it would not result in an agreeable color. I will show you the action.

I have here some hyposulphite of soda dissolved in water, about five ounces to the quart. In the first place, I put a portion of one of the prints in the solution of hyposulphite of soda, and would have you observe the effect, for I do not immerse the whole of it, because I wish to show the contrast. I think you can all see a marked difference; that looks quite red, and this a rich brown. As I look through it, the part out of the liquid seems rather opaque, and the immersed part becomes rather more transparent, but mottled as if it had the measles. To know when the action has continued long enough, you must take an occasional glance at its transparency; it must show a uniform degree of transparency. You observe the print is becoming a very unpleasant red color; therefore, we must treat it by some other process prior to the immersion into the solution of hyposulphite of soda. In other words, we must tone it; this is substituting gold for silver. The gold used by the photographer for this purpose is in the condition of chloride of gold. It comes to us put up in little bottles, like homœopathic medicines; it is a yellowish-looking salt. Each bottle is said to contain fifteen grains of the chloride of gold. To have it in a manageable form, it is well to dissolve it in fifteen ounces of water. It is usual to use one grain of gold to each full-sized sheet of paper, the paper being cut up afterward into convenient pieces; and it is easy to estimate the quantity of gold which would be required in toning them. Now, supposing that we have a little over one sheet. I pour into this graduated measure two ounces of the solution, which in this acid condition would not yield itself up to the picture; to keep, it requires to be slightly acid.

(To be continued.)

Photographic Mosaics for 1867, will be issued in December.

BIERSTADT'S GEMS OF PHOTOGRAPHY.

Our subscribers frequently give us great pleasure, and send us on most pleasant journeys, *via* the great engine of Photography, with only the expense of a little time. Messrs. Bierstadt Bros., of New Bedord, Mass., have recently sent us on a very long trip of this kind, making 120 stoppages (which they call "a few" in their kind letter), and although to places where we have been before in a similar way, we return with old memories freshened, and new sights to talk about.

The gems of the lot are two glass pictures of the moon, shining through the clouds, and upon the water. We seldom see anything more beautiful, although the two pictures of the moon from Mr. Rutherfurd's negatives, also in this parcel, are as beautiful as can be.

Twenty-seven views of Niagara and thereabouts now follow, showing the Falls from both sides, and under and over them; the rapids, above and below the Falls; the river; the tower; the islands, and the bridge with the locomotive and train on top in motion, from almost every possible point of view, each view creating new wonder and astonishment.

Several views of Boston follow these. Had we never been there, we could guess what they were, for it is our habit to conclude when we see a street view where one can only see a block or two in a straight line that it is Boston, for it is the crookedest place in the land.

Fifty different views of the White Mountains come next. How shall we describe them? We are unequal to the task. They must be seen. They are of all the places whose names are familiar to our readers, and which are well known to travellers. Frost Works on Mount Washington; Under the Snow; Winter Views at Crystal Cascade; Winter Views in the Flume; Winter View at Glen Ellis Falls; Echo Lake; Above the Clouds; and several magnificent Cloud Views near Mount Washington, are all new and worthy of more than special mention. The cloud views are grand. A great sea of clouds covering the whole earth from view gives one an idea of the state of the world before God said, "Let there be light!" Such magnificent effects one seldom gets with the camera.

A number of interesting views of the most beautiful parts of Central Park, New York, are next in order, accompanied by views in a Fifth Avenue Conservatory; Views in New York Bay; The High Bridge; Genesee and Trenton Falls; and of "Sunny Side," the late residence of Washington Irving; Views in the Glen; near Spouting Rock and Purgatory, Newport, R. I.; and some enchanting scenes on the Mohawk River, N. H. Some pictures of flowers are also excellent.

MORE ABOUT BROMIDE.

It seems that we are never to be released from the bonds of bromide. We announced in our last, that we had received from Messrs. Cramer & Gross, St. Louis, Mo., a translation of a bromide process, published in 1851, but that we could not publish it unless we were satisfied that the process was correctly translated. They have sent us another copy, through Mr. John A. Scholten, one of our subscribers, verified by the Vice-consul of France, at St. Louis, which we print below. We shall express no opinion concerning it, as we have said too much already on this vexatious subject. So our friends will form their own ideas concerning it, and act as seemeth to them good. We print the extract, and a translation of the consular certificate:

"*Chimie Photographique, par Wm. Barreswil & Davanne. 2d edition. Paris, Mallet Bachelier, Quai des Augustins*, 55, 1851.

"*Page* 100.—Many photographers add a soluble bromide (of cadmium, ammonium, or potassium) to their collodion, for the purpose of having bromide of silver in the sensitive film; really, the bromide of silver has the property to be impressed by rays of light which have no influence on the iodine, the green for instance. The quantity of soluble bromide is generally equal to the fourth part of the iodine employed, say:

Rectified ether, . . .	67.00	grammes.
Cotton, ...	1.00	"
Alcohol at 40 degrees, .	33.00	"
Iodide of cadmium, . .	1.00	"
Bromide of cadmium, .	0.25	"

"The addition of bromide is principally useful for taking landscapes or copies; it can also be used for portraits, but it diminishes a little the sensitiveness of the collodion, as experience has so far proved.

"The following formula, in which the three iodides and bromide of potassium, ammonium, and cadmium are mixed, yields a collodion which may be preserved a very long time: Take

Rectified ether, . . .	67 grammes.
Gun-cotton, ...	1 gr.
Alcohol at 40 degrees, . .	33 grammes.

Weigh off:

Iodide of potassium, .	0.20 gramme.
" ammonium, .	0.35 "
" cadmium, .	0.35 "
Bromide of potassium, .	0.05 "
" ammonium,	0.10 "
" cadmium, .	0 10 "

"Put the iodides and bromides in a small porcelain mortar; pound them, and add a small quantity of collodion, to facilitate the solution; put the whole in a collodion bottle, shake well, and let settle for three or four days before use.

"We could give a hundred different formulas, but we believe we have given too great a number already, and we cannot too much recommend to the reader to employ the simplest ones."

I, Henri Le Vasseur, Vice-consul of France at Saint Louis, Mo., certify that the above writing is a literal and exact translation of a French work, having for title, Photographic Chemisty, by Messrs. Barreswil & Davanne; published at Paris at Mallet Bachelier's, in 1851. The translated passage commencing at page 100, line 6, and ending page 102, line 10.

Witness my hand and seal, at St. Louis, September 19, 1866.

[SEAL.] H. LE VASSEUR.

[U. S. Government Stamp.]

The above processes were alluded to by Mr. Hubbard in his advertisement in our last.

WESTWARD.

As we intimated in our last, we have made a very pleasant trip to the Northwest, and are safely returned to our labors. We left our city comfortably fixed in an elegant sleeping car on the Pennsylvania Central Railroad, and knew very little about anything until we reached Altoona next morning, where resides Colonel Edward H. Williams, the General Superintendent, whose study and delight it is to make the passengers comfortable who travel on this great thoroughfare. That he succeeds no one will deny after seeing the wonders, and feeling the comfort there is to be enjoyed in riding from Philadelphia to Pittsburg. Our first halt was at Cleveland, Ohio, where we remained three or four days, finding many friends and much pleasure with them, though nothing of any photographic interest. We would like to tell our readers all about this lovely and beautiful city; but our pages being crowded, we must deny ourselves that pleasure.

Departing from Cleveland, we connected with the Pittsburg, Fort Wayne and Chicago Railroad at Crestline, the favorite and shortest route to the West, and again riding all night in another palatial sleeping car, which we found almost as enjoyable as our own humble cot, we arrived in Chicago in a storm, speaking words against anything photographic being accomplished.

We there joined our friend, Mr. John Carbutt, and spent nearly a day, examining the curiosities and beauties of his gallery. The most wonderful attraction was his solar camera, described so accurately in our last. While there, Mr. Carbutt sat a gentleman for a solar negative, and in exactly fifteen minutes from the time he began to make the sitting, he had a proof ready printed by his camera to show his customer. We think this is as quick work as there is on record, and speaks much in favor of Mr. Carbutt's solar camera. Every photographer is welcome to go and see it, and take copy. Some of the heads made by it are certainly equal, if not superior in sharpness to anything that could possibly be made by the contact process.

We desired to see more of Chicago, and the many friends of our Journal there; but a trip to St. Paul having been previously arranged, it was our first effort to accomplish that. Mr. Carbutt had his traps nearly ready, and the following is a list of them.

Dark tent and tripod, as described in our first volume, including all the necessary chemicals for emergent use; stereoscopic box and tripod; whole plate box; two boxes of cleaned glass; a negative box; two pairs of Dallmeyer lenses; a Zentmayer and a Ratio lens; focussing cloths, &c. &c., and a small trunk. The camera boxes and all the other paraphernalia, except the tent and tripods, were carried in two boxes of thin wood of proper size, which were very easily carried in the hand by means of straps. Everything taken along could be very comfortably carried in the hand, except the trunk, which was only taken to hold surplus plates, developer, hatchet, screw-driver, baggage, &c.

We left Chicago at 9 A. M., and made our first stop at Kilbourn City, Wisconsin, arriving there at dusk. Next day we made our first negatives of the Dalles on the Wisconsin River, about two miles distant from the village. We there found some most curious formations of rock, piled up in great columns, rounded and worn by the mighty action of the waters. The first plate was dipped there, and a very satisfactory negative secured, after we had waited awhile for old Sol to get just where we wanted him. We were unable to get the most beautiful portion of the Dalles, as the sun never shines upon it. Bath, collodion, and everything worked most satisfactorily. We shall speak more particularly about them in a future issue, and describe them. Leaving the beautiful Dalles, we returned to Kilbourn, took some lunch aboard, and started for Devil's Lake, seventeen miles distant. We were too late in the afternoon to make a good picture of it. This we much regretted, but desiring to go to La Crosse that evening, we made haste to get back to Kilbourn City. After a ride full of peril in the dark, we arrived an hour too late to catch the train we desired. A more graphic description of that day's adventures we have left to fairer hands.

The next train arriving at 2 A. M., we left Kilbourn (why it is called city we cannot imagine, for there is only one photographer there), and after seven hours' ride through wild western lands covered with trees most gorgeously colored by the frosty crayons of Nature, we arrived at La Crosse. We made one new friend there, and had a capital opportunity of testing our patience, our boat being nine hours behindhand. The water in the Mississippi being very low, we were forced to move slowly, but anything to relieve the monotony of waiting Stepping aboard the packet "Northern Belle," Captain Gabbert, we were soon moving up the great river of rocky bluffs, islands, sandbars, and fish.

After a hearty supper, we paced the deck an hour or so, watching the streams of stars flying from the tall smoke-stacks, and the great giant bluffs staring at us at every turn.

In the morning we awoke at Winona, and there changed boats, the Northern Belle being too large to proceed further up safely. After a day of wondering at what we saw, the scenery varying every mile, and growing wilder and more beautiful as we advanced, and another night's comfortable rest on the steamer Damsel, we arrived in the great city of St. Paul.

Making pictures being our first desire, we procured a conveyance, and proceeded to Lake Como, about three miles distant. We there met with our first reverses. We had elegant light and beautiful scenery, but, alas! those streaks! Every plate developed streaky. Such streaks we had never seen before, so packing up, we drove over to the Falls of St. Anthony, meanwhile theorizing as to what the streaks were. Mr. Carbutt having photographed St. Anthony's to his satisfaction on a previous occasion, we made no effort to secure anything there. Negatives that he then made cannot be duplicated. St. Anthony's, as it was, can never be seen again. The requirements of man for water-power have spoiled these once wonderful falls by separating and damming them, though leaving much wonder and beauty still there.

The next day was spent at the lovely Falls of Minnehaha, where we secured a number of stereoscopes and whole-plate negatives. The latter we shall print from and use as the embellishment in a future issue. We think we secured something very nice. We also tried our Zentmayer lens, kindly furnished by Mr. Zentmayer, and the Ratio from the American Optical Company; but the

subject being bad, and the hour late, we got nothing satisfactory with them.

We stopped at Fort Snelling on our return; but having previously made good negatives of that also, Mr. Carbutt made no further efforts at that place.

Returning to St. Paul, we found our negatives free from streaks. We discovered that they were caused by the albumen with which the plates were coated, and having washed it off, we found everything to work nicely. Filtering the bath over night, the next morning we drove over to White Bear Lake, about fourteen miles distant. This lake is about seven miles wide, and in a very wild section of country. To hunt and fish there before the white man came, must have been a great delight. We photographed it to our heart's content. The chemicals and all things working splendidly; we secured some very nice results, had a good time, and considerable hard work. It is very comfortable to sit down and examine a lot of beautiful stereographs. But, uninitiated readers, did you ever think what a trouble it is to secure such pictures? Carrying apparatus up and down high bluffs, through fields and sand, and over rocks, cutting down trees, and carrying logs and old branches to help make a pleasing foreground; running after water and managing obstreperous compounds, is not *all* pleasure, though there is some in all of this. Think, when you look, sometimes, and it will help your appreciative faculties.

We also made trials of the several lenses at White Bear Lake, but must ask our kind friends to bear with us until our next for a report of our experiments, having had no time yet to make and examine prints.

We are willing to say now that we were charmed exceedingly with the Zentmayer lens, and that after certain alterations which they propose to make, that the American Optical Company have something very good in the Ratio lens. We shall also go more into the details of our trip hereafter.

The next day Mr. Carbutt endeavored to make some whole-plate views of the city from the bluffs across the river, but found his plates badly fogged. As our departure was made at noon, he could not doctor the disordered bath until after going aboard. We left St. Paul on the steamer "Julia," and had the opportunity of seeing that portion of the river by daylight which we passed at night before.

We passed many beautiful subjects for the camera, but the only way to secure such gems would be to take a month, and rough it on a private steamer. Mr. Carbutt has fine negatives of Barn Bluff, Maiden Rock, and other prominent places, but there are many more to secure. Messrs. T. Bricher and C. B. Russ, the eminent artists, have been making sketches this summer, and Messrs. L. Prang & Co., Boston, will reproduce them in chromo-lithography. This will be a grand chance for our readers to see the wonders of the Great Father of Waters. To hear its charming and exciting legends would also be a joy.

After proceeding a few miles, Mr. Carbutt took his sick bath in hand, and, after consultation, concluded it was suffering from a too close and lengthened confinement in an aged India-rubber bath holder, and therefore decided to dose it, and, if possible, to effect a cure. After searching the steamer's medicine chest through for some ammonia or carbonate of soda without finding any, knowing that carbonate of ammonia was used in pastry he applied to the cook for some, and obtained it. He added a small quantity of this to the bath, and sunned it for an hour. After that he filtered it, and added 6 drops of nitric acid (bath 40 oz.) which he obtained at one of the landings. On the trial of a plate all worked as well again as if nothing had occurred.

The day passed pleasantly, as did also the second day of our trip down the river. On the second day we changed boats again, and took the "Milwaukee," Captain Holcomb, at Winona. A Mississippi lumber-raft and two very fine negatives of the steamer while the men were carrying wood aboard, were made during the second day. At evening we arrived at Dubuque, Iowa, where we remained over Sunday, returning to Chicago on Monday. We had a most delightful trip and much enjoyment, which we shall never forget.

Mr. Carbutt, having been on a number of such journeys, had reduced his manipulation to a system. The charms of his tent are great, and it was a great delight to us to

work with it. It is handy in every way, and we certainly found no trouble in using it. Many others can indorse its advantages. After development the negatives were washed with about two ounces of water, and coated with glycerine. They keep for weeks in that way, and are fixed and redeveloped, if necessary, on the return home. Prints from all of the negatives we have described can be had from Mr. Carbutt.

Our regret is that we have not space to describe our trip more at length, but we must not close without special mention of the Northwestern Union Packet Company, which is one of the great wonders of the great West. All the freight and passengers to the Northwest are conveyed by it. Its officers are: President, W. F. Davidson, St. Paul; General Manager, John Lawlor, Prairie du Chien; Secretary, George A. Blanchard, Dubuque; Treasurer, William Rhodes, St. Paul; Superintendents, William E. Wellington, Dubuque—P. O. Davidson, La Crosse. We had the pleasure of meeting several of the officers.

The "Milwaukee" is a specimen of their packets. She is 251 feet long and 35 feet beam. The cabin is 200 feet, inside measure. A most excellent table, comfortable and clean state-rooms, and obliging attendants, make a trip on the Upper Mississippi a most agreeable one, and one that must become immensely popular.

We are glad we went, and are safe home again. We found a pyramid of correspondence and exchanges to attend to, but our absence must account for all delays. When we issue our Minnehaha picture, we will describe fully the processes used.

PHOTOGRAPHIC SUMMARY.

BY M. CAREY LEA.

ENGLAND.

Vignetting.—W. H. Davies recommends photographers to prepare their own vignetting-glasses as follows: Take quick-drying copal varnish, such as is used by coachmakers when rapid drying is required, and thicken it with either Italian pink, Chinese orange, or burnt sienna, which are to be had, ground in oil, from dealers in artists' colors. If the varnish is too thick, thin it with turpentine.

Place behind the negative to be vignetted a plate of glass of equal size, and with a camel's hair pencil, dipped in the color, trace the outline which it is desired to preserve; then, with a larger brush, cover all the space outside with the colored varnish. When tacky, take a camel's hair pencil, dipped in turpentine, and soften the outline into the clear glass. When quite dry, repeat the process, keeping an eighth of an inch back from the first border.

According to Mr. Davies, the colors above mentioned stand perfectly, and the varnish may be used for any photographic purpose in which a non-actinic coating is desirable.

Br. Jour.

Pin-holes in the Negative.—The received opinion is that this annoyance arises from the interposition of opaque crystals of iodonitrate of silver, which, resting on the film, cast their shadows upon it, and cut off the action of the light. This does not show in the development, because the crystals themselves conceal the want of actinic action beneath them; but in the fixing these crystals are removed, as well as the unaltered iodide underneath them.

In a communication to the "British Journal," Mr. McWatters affirms that on several occasions he has cured a tendency to pin-holes by filtering his *developer*. If it be found that pin-holes can arise from solid matter in the developer, the opinion above mentioned will have to be modified materially.

Recent examinations, however, by Mr. Dawson and Major Russel go to substantiate the older view of the matter. Major Russel differs from Dr. Vogel as to the greater solubility of the iodo-nitrate in cold solutions than in hot, and holds the contrary opinion. The facts seem to be as follows:

1. There are some cases in which a perfectly clear negative bath will become cloudy by the mere warmth of the hand applied to the test-tube in which the bath solution is placed. This points to the existence of a substance which is precipitated by heat.

2. If a strong solution of nitrate of silver be placed over pure iodide of silver, part of the iodide will, of course, dissolve. By heating, a further quantity is found to dissolve.

This indicates the presence of a substance more soluble in hot than in cold solutions, and this substance, of course, cannot be identical with the former.

3. When a bath is saturated with iodo-nitrate, the addition of *water* will cause the precipitation of needle-shaped crystals; the addition of *alcohol* will not. It follows, therefore, that alcohol in the negative bath tends to keeping a larger quantity of this substance in solution, and is, therefore, favorable to the production of pin-holes.

It is greatly to be regretted that these examinations do not yet place us in a position to avoid this well-known annoyance; but it seems tolerably clear that heat favors the production of pin-holes. It would, therefore, seem to follow that the bath should be kept in a cold place when not used, and before using be carefully decanted from anything that it may have deposited.

Weak and Strong Printing Baths.—The importance of consuming as little nitrate of silver as possible in sensitizing paper, and the varying experience of those who have reduced the strength of the printing bath, has led to a good deal of discussion.

It is asserted that a principal difficulty where the strength of the printing bath is deficient lies in the injurious effect of the fixing bath, which takes from the force of the picture; this, again, has been traced back to the effect of the sensitizing bath upon the layer of albumen.

It appears, from experiments of Dr. Reynolds, that weak solutions of nitrate of silver, although they may coagulate the albumen, do not bring it to a condition of insolubility in the fixing bath. In other words, he affirms that albuminate of silver, when formed by weak sensitizing baths, dissolves in hyposulphite of soda.

Mr. Davies, in the "British Journal," strongly advocates the plan of coagulating by steam, with the same object that Mr. Pine and others have proposed using alcohol, and Mr. Ramsden, in London, has carried out this project commercially. Mr. Dawson suggests that possibly the salting of albumenized paper has been carried too far. This indicates a tendency in that direction which Dr. Schnauss carried so far as to suggest the omission of chlorides altogether, depending solely on the albuminate of silver, and what little alkaline chloride was naturally present in the albumen. It seems doubtful, however, whether the saving effected by cutting down the salting below six or seven grains would effect any economy worth considering in the face of the loss of brilliancy which could scarcely be avoided.

GERMANY.

Cleaning Powder.—The following mixture is said to have been found by use through a series of years to be most excellent, and never to give rise to holes in the collodion film:

Take $1\frac{3}{4}$ pounds of burnt alum, finely powdered and sifted, and $\frac{1}{2}$ pound of fine charcoal dust (Linden charcoal, used for dentifrice).

The plates are rubbed with this mixture, with the addition of a few drops of alcohol, and, finally, the edges wiped carefully with tissue-paper. *Correspondenz.*

PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

PROCEEDINGS AT REGULAR STATED MEETING, WEDNESDAY EVENING, OCT. 3, 1866.

At a meeting of the Society, held this evening, the minutes of the last meeting were read, amended, and approved.

The Committee on Mr. Zentmayer's Lens, reported progress, and were continued.

The Committee on the Durability of the Latent Image on Dry Plates, also reported progress, and were continued.

The President offered a print of Trinity Church, presented by Mr. Anthony, of New York. The print was from a negative made with a lens, the invention of Mr. Emil Busch, of Rathenow, Prussia. This was exhibited to the Society.

Mr. Hurn offered to the Society, from Mr. James G. McClees, a daguerreotype made by M. Daguerre.

On motion, the Corresponding Secretary was instructed to return the thanks of the Society to Mr. McClees for the donation of the picture.

Mr. Wenderoth exhibited samples of the new Star Varnish, invented by himself, and coated a plate with the same. It possesses superior hardness, and he stated that it is

produced at a lower cost than ordinary varnishes, and requires no heat for drying the plate.

On motion, the Society adjourned.

OUR PICTURE.

THE charming picture in this number is from negatives kindly sent us by Mr. J. Inglis, Montreal, Canada. The splendid little fellow, who is the main figure in the picture, is the son of Mr. Inglis, and has the faculty of putting his little face in almost any shape he pleases. We have pictures of him in some twenty positions, and each one representing a different character.

In the present instance, the photographer, desiring to make his picture, poses him properly, and with the usual admonition—"right still now!"—turns to remove the focussing cloth from the lens; while making the exposure, our youthful sprout plays an unexpected trick upon him, giving us a laughable result. To show the wonderful command he has over his features, we would state that we have printed from three negatives, and the expression of the child is nearly the same in all.

Mr. Inglis has sent us his working formulæ, which we are compelled to lay over until our next, for want of space. They will not spoil by keeping. The picture was made with a 4 x 4 Voigtlander open lens, and is therefore not offered as a model of sharpness, but is a most natural and charming picture.

Salad for the Photographer.

A CONVENIENT stand for touching up negatives may be made by inclining a frame-work, at a suitable angle, over a sheet of silvered glass. A piece of finely-ground glass is placed on the frame-work, and the negative upon this. A sheet of card-board larger than the negative, and with a circular hole about one and a half inches in diameter, is laid upon the negative, and this card-board is moved about according to the parts of the negative requiring attention, while the artist uses the spare card-board for getting his brushes in order, giving them the proper amount of color, &c., and holds in his left hand, which is supported by the frame-work, a magnifying lens, by which he can better see the quality of his work.—*Br. Jour.*

RECOVERING THE GOLD FROM TONING SOLUTIONS.—Mr. Wm England publishes the following in the *News:* Precipitate, as usual, with sulphate of iron. Wash the deposit well, and place it in an evaporating dish, then add nitric acid and boil it for 15 minutes. After boiling, and allowing to cool, dilute with water. Let the precipitate subside, and pour off, saving, of course, the liquid, from which the silver may be thrown down in the usual way. The purple precipitate of gold may, after one or two washings, be treated with aqua regia, and evaporated, and as fine crystals will be obtained as from pure gold. Mr. England adds that he has found that twelve ounces of precipitate contains about eight ounces of silver and four of gold.

TEMPTING.—A photographic hair-dresser in England, offers his male customers "a shave and their shapes," for sixpence; and the ladies, "a likeness and a box of pomatum," for the same amount. A hatter also offers a likeness to every one purchasing a hat of him. *News.*

MR. W. R. GELDERD, of Portchester, N. Y., says: "I have got a splendid developer in use. It is simply to saturate my ordinary developer with sugar. That is:

Water, ...	12 ounces.
Protosulphate of iron, .	½ "
Sulphate of iron and ammonia, ½	"
Ammonia, . . .	4 drops.

Acetic acid enough to clear the deposit which the ammonia causes. When clear, add your sugar."

IN Mr. Hull's collodion formula, given in our last, read tincture of iodine for tincture of iodide.

Editor's Table.

The New Size.—We have received a variety of opinions in relation to the new size, and the general conclusion is, that it would be best to fall in with our Britantic brethren, and have the size uniform. The New York people have held a meeting, and adopted it. Messrs. Anthony & Co. are making albums to suit; Wilson & Hood are making Bergner's cutters as fast as they can, to meet the demand; Sherman & Co., new mounts, and there seems to be a general purpose to push and make the thing go. Mr. William Notman has sent us a most charming specimen made by him, which he offers for embellishment for our January number, and which we have accepted. We think we never saw a finer plain photograph.

The paper in our last on this subject seems to have created quite an excitement among our photographers. Mr. Jesse J. Groom, of our city, has sent us several very fine specimens; Mr. C. J. Richardson, of North Bridgewater, Mass., has also favored us in the same way, and wishes the new size "God speed." We have had some trouble to get some of our leading artists to begin, but think they will all be at it before our next number is out.

Those who have 4 × 4 tubes can make two of the new size on a 4-4 plate by using the shield reversed. Mr. Groom gave us this idea, which is a capital one, as it saves altering boxes, and one can vary the positions. Don't make the prices too low. Keep them up. Mr. Carbutt, who has been pushing them in Chicago, says:

"I have read with special interest, in this month's number of *The Photographer*, your remarks on the new size, or 'cabinet portrait,' together with those of the editor of the 'News;' and I fully agree with you that the size selected by Messrs. Window & Bridge, of London, is of about the right proportions, and will enable a qualified photographer to produce effects of artistic portraiture not before attainable by the old style. Since the decade of the carte-de-visite set in, I have made it a point in my business to *push* plain solar portraits, and the result is I frequently have orders for as many in one day as I before had in a week; and I believe if our principal photographers will adopt a new size, and at *once*, and, whatever size is adopted, if it be made known through the journals, the result will be a speedy return of prosperous times again to the photographer and manufacturers of albums. Now, in regard to the size to be adopted, I am in favor of 'the cabinet portrait,' as originally announced, for the reason that it is a new and distinct style from its predecessor, its appearance every way better, and will warrant our asking about double that charged for the old style. I have been the first to introduce them to the citizens of Chicago, and charge eight dollars per dozen for vignettes, and six dollars for plain. I inclose you a few specimens. Another reason why I prefer the size of print to be four by five and a half, or thereabouts, is, that for any size materially less we should find it difficult to get any more than is now charged for cartes-de-visite; yet I know American photographers would much prefer it if they could be made on the four and a quarter by five and a half plate. Vignettes could be made on that size; but I think it would be found practically impossible to make the plain prints on them. I have made some experiments in producing various sized prints from our half plate negative, keeping the proportions to the 'cabinet' as nearly as possible, and find no difficulty in producing a clean plain print of the following dimensions: size of print, three and three-quarters by five; size of mount, four by five and seven-eighths. Should either this, or the size introduced by Messrs. Window & Bridge, be adopted by American photographers, I shall be glad to co-operate with them in bringing them before the people. Let the title, 'the cabinet portrait,' be kept clear from cartes and album pictures."

Who else is at work? Let us hear how you succeed.

Photographic Mosaics.—This little compilation met with such unexpected success last year, that we have concluded to issue a second part about the holidays. The whole matter will be entirely different from the other, and on the same plan. Stockdealers should send in their orders early. Advertisements inserted at former rates, and no charge made for inserting in extra editions. One payment covers the expense of advertising in all that are published. Those who have our former edition will not fail to send for early copies of this. Mailed by any stockdealer. Paper, 50 cents; cloth, $1.00; post paid.

To S. S. S., Cincinnati.—We fear you have been guilty of *dirty hands*. Your picture looks as if you had either washed it, after toning and fixing, in the same water that you used to remove the free nitrate, or had hypo. on your hands and

put them in the water where your prints were being finally washed.

Why Your Numbers are Missing.—We think we have found out why our subscribers are compelled to report their copies missing, and pictures torn out. We have written to the Post-office department about it, and hope to be able to protect both ourselves and readers against further loss in this way.

"G. W. W." will find it best not to make too much collodio-chloride at a time. Use a good strong cotton for your plain collodion, and make, say four ounces at a time. Pour a little plain collodion in your mortar, add your chloride of strontium, and pound it until it is entirely dissolved. Treat the silver in the same way, and, finally, the citric acid likewise, and mix the whole, and shake well. Be sure all the parts are dissolved entirely, and use no water. If your prints lack vigor, use a stronger albumen coating, say one part water and two parts albumen. By care, you ought to secure very good porcelain pictures in this way.

"C. & P.," Salem, Oregon. "What is the matter with your pictures?" Well—*everything!* Negative not sharp; collodion streaky; paper silvered in too weak a solution; prints overtoned, and emphatically bad. We are really ashamed of your being one of our subscribers. Get down those back numbers, knock off the dust, cut the pages, read them, and do what they say. Try to make a sharp negative; use better cotton; silver your paper longer; and do not use your toning solution under twenty-four hours of age.

Instantaneous Photography by Artificial Light.—Some experiments have been recently made by Mr. Skaife, in taking photographs by artificial light instantaneously. A plate, carefully prepared, is put into a camera; the sitter, in a partially dark room, engages in conversation with any one, so as to secure a natural play of expression; a little powder on the pan of a lamp of peculiar construction is set off in a puff, like the flash of a charge of gunpowder, and thus an instantaneous picture is taken. The powder is composed of certain parts of pulverized magnesium and chlorate of potash, and is set on fire by being heated by a spirit-lamp under the pan, which has a hole in it, and the light is brought into contact with the dry powder when the pan is slightly shaken by means of a wire. The pan having a reflector at the back, the light is thrown full on the sitter; and the negative is said to be obtained in about the fiftieth part of a second.

Death of Mr. Glover.—We learn from an uncertain source that Mr. Ridgway Glover had met a violent death at the hands of the Indians, and been scalped. We trust we shall be enabled to deny the report in our next.

"A Manual of Griswold's New Ferro-Photographic Process for Opal Printing on Ferrotype Plates." By V. M. Griswold, Peekskill, N. Y. Published by the author, and for sale by all the dealers.

In his manual, Mr. Griswold makes his process very plain. The results that can be obtained by it are so beautiful that it ought to become very popular. As the requisites are now for sale, every photographer may try it.

Views of the Capitol.—From Mr. L. E. Walker, photographer at the Treasury Department, we have received two magnificent views of the Capitol building, showing the north and east fronts. They were made on about 18 x 22 negatives, and are a wonderful triumph of skill and manipulation when we consider the labor required to make a view of that most difficult subject. The globe lens did its work well.

Mr. William Bell, photographer at the Army Medical Museum, also sends us some 4-4 prints of the same view of the Capitol, which also show most careful manipulation. Mr. Bell has also favored us with four admirable negatives, from which we shall print for a future number of our Journal. They are a prize which our readers shall share the pleasure of some time *next year.* We have some elegant things in preparation for our next volume, each one of which is a photographic gem We trust we shall keep all our present subscribers to see them.

If "D. P. D" will please send us his address, we will return his manuscript. Poetry requires so much space, as a general thing, to tell so little, that we must deny ourselves the pleasure of using it. If "D. P. D." will write us a right good prose essay on the same subject, we will consider it. This is too long, and carelessly written.

February Numbers, 1866.—We will pay 75 cents each for February numbers of the present volume of our Journal. Parties sending them in will please send their address also, so we may remit. 100 copies wanted immediately.

THE

Philadelphia Photographer.

Vol. III. DECEMBER, 1866. No. 36.

PHOTOGRAPHING IN THE MAMMOTH CAVE.

BY CHARLES WALDACK.

ACCORDING to promise, I now proceed to give you the result of my experience acquired with magnesium light during my second photographic excursion in the Mammoth Cave. As it would be too long and too tedious to give the history of each picture we took, I will limit my communication to general facts and conclusions.

The results we obtained, although satisfactory, do not possess the degree of excellence which I expected, and which I am fully confident can be attained under better conditions, and with implements better suited to the purpose than those we had in use.

I am also disappointed in the number of negatives we obtained. We found it impossible to make more than two or three pictures a day, the walk to the spot of operation, the studying-out of the picture, the disposition of the camera and reflectors, the focussing, the fixing of the magnesium in the reflectors, &c., taking up a considerable time. We also used a much larger quantity of magnesium to obtain a given number of negatives than we did during our first excursion, on account of attempting pictures of larger objects. It should be borne in mind that the rays of artificial light are divergent, and lose their intensity in proportion as they go from the centre of illumination; thus, an object situated at forty feet will only be half as much illuminated as one of the same size at twenty feet.

In the first letter I addressed to *The Photographer*, I mentioned the fact that the reflectors or screens, supplied to us by the American Magnesium Company, threw the light at an angle much wider than that included on the plate, and I concluded from this that by using reflectors more concave, and with the sides extending further, much light could be gained, and pictures could be taken with a smaller quantity of magnesium; this I found, on trial, to be a mistake. These tin screens are very imperfect reflectors, and become much more so by a coating of the oxide of magnesium, which deposits on them as soon as the metal begins to burn. One monster reflector, thirty inches wide, and about forty high at the mouth, proved, however, much more effective than the smaller ones, on account of the surface remaining comparatively bright, and we many a time expressed a regret that all were not of such size. Our *pet* can be seen represented in the very imperfect stereograph of the *personnel* of the expedition ready to start on a two days' excursion. The great objection to it is its great size, which makes it very inconvenient to carry and drag through such narrow and low

places as *Fat Man's Misery* and others. All lamps and apparatus in which the magnesium is burned slowly, and with more regularity than in the tin screens, are useless for Cave photography, for before all the magnesium required is burned the picture is obscured by the smoke. We have even found it inconvenient, for this reason, to use the tapers twisted with iron wire, which take four or five times as long to burn up as the others, and have to run the risk of part of the magnesium melting and falling to the bottom of the screens for the sake of giving short exposures; even then we could not get rid of the smoke entirely, as will be seen by the fogginess of parts of some of our pictures.

None of the lenses manufactured here or in Europe answer the requirements of Cave photography. The pair of Dallmeyer stereos we procured for the purpose we found, in general, better adapted to our use than the No. 2 carte-de-visite Ross lenses we used during our first excursion, on account of their including a wider angle, and of their bringing objects in different planes better in focus. The whole plate, short focus Voigtlander proved very deficient in this last respect, and was, therefore, in consequence not used. The lenses which, I think, would be most suitable should be of large diameter, so as to admit much light (of such a diameter as, for instance, Ross's No. 3, or Dallmeyer's No. 2 carte-de-visite lenses). The focus should be the same as Dallmeyer's stereos, so as to include the same angle. Lenses giving the same angle of view as the Globe might sometimes be useful; but in many cases it would be difficult to place the reflectors out of the field included on the plate. A third and most important quality lenses for Cave photography should possess should be to divide the focus; this quality has hitherto been considered as a defect by opticians, inasmuch as it is obtained by an imperfect correction of the spherical aberration. The strongest magnesium light is so weak in its action on the sensitive film that the use of small stops has to be discarded, so that we have to be satisfied either with having one plane in focus, and the rest out of focus, or to sacrifice the extreme definition of one part to a fair definition of the whole. I had no opportunity to test Mr. Claudet's plan of moving the lenses or plate-holder during the exposure, as my attention had to be directed towards the proper lighting of the object, and that, besides dampness and sand, interfered with the easy motion of these parts.

The manufacture of lenses possessing this quality of dividing the focus has lately been urged by G. Wharton Simpson, Esq., and others, and I see by advertisements in the English photographic journals that opticians have taken the hint. I have little doubt but that a lens possessing the requirements mentioned above can be manufactured; it would be a great boon not only to subterranean photographers, but also to those who wish to make instantaneous pictures by natural light. I never felt the want of a very sensitive process more than when photographing in the Cave. A more sensitive collodion than the one I used, or a developer which would bring out a picture with a a shorter exposure, would have greatly lessened our difficulties. Before starting, I made several samples of collodion according to different formulæ, and with different samples of cotton, but did not succeed in obtaining one which was more rapid than the one of which I gave the formula in my last letter. I also tried samples of different makers, all with the same result. This and my previous experience leads me thus to believe that extra sensitive collodion is a delusion, and that sensitiveness does not depend on the kind or quantity (within certain limits) of the iodides and bromides, provided the collodion be used *at the right time.* Some marvellous instantaneous pictures that one sometimes meets with are, I think, more the result of quick-acting lenses, and a favorable condition of light, than of ultra sensitiveness of the chemicals. The imperfections of the negatives we obtained are mostly caused by insufficiency of light. In some cases, the objects were too distant from the source of light; at others, they were of a brown or yellow tint, or covered with a mud or clay strongly colored by iron. Such subjects as the last mentioned present difficulties by sunlight; of that nature are a group of huge stalactites in Mammoth Dome, called the *Corinthian Columns.* We

succeeded, however, in getting a fair picture of them with ninety tapers.

The white gypsum formations in Cleveland's Cabinet, on the other hand, present less difficulty, and require less magnesium; these affect the form of roses, snowballs, rosettes, &c. We photographed them with the cameras tilted upwards; but the ceiling being only twelve or fourteen feet high, we only got good definition in the centre part of the picture. We hit upon an expedient, however, which allowed us to obtain a better result. One of the legs of the tripod was folded in so that it had only half the length of the two others; these were secured against moving by laying rocks on the ends. In this way, we managed to get the camera pointing upwards at an angle of about thirty degrees from the vertical line. The subject of the picture was part of a ceiling covered with white gypsum, the principal object of which is a rosette, about seven or eight inches in diameter, called the *Last Rose of Summer*. Unhappily, we were unable to make use of the same dodge again, for on this picture, which proved to be an excellent one in most respects, we burned our last magnesium (twenty tapers).

Want of light, or insufficient exposure, is a source of many evils in photography. Underexposed negatives, no matter what care has been taken in cleaning the glass, are very apt to have a deposit in the transparent parts; this evil I always found less when using the English patent plate, but it was impossible to procure it here. The best French or Belgian glass, although quite good for negatives by natural light, cannot be cleaned well enough for making pictures which are comparatively underexposed, or for subjects in which, owing to the method of illuminating or to distance, are partly in gloom. The French polished plate would answer as well as the English patent plate if it was not so liable to break in the printing-frame; but having experienced its worthlessness in this respect, I did not feel inclined to use it for negatives which, in case of accident, would be difficult to replace. Certain parts of the Cave, such as the regions near Lethe and Echo Rivers, the Bottomless Pit, Gorin's and Mammoth Dome, &c., are very damp; it takes but a short time for the dampness to permeate everything. The dusting-brush makes streaks on the glass; the slides of the plateholders draw out with difficulty; the back end of the camera does not obey the rack and pinion. Lucky you are if the water does not drop on your lenses, for you can find nothing dry to wipe them with. In the least damp of the places spoken of above a sensitized plate was kept for twenty-four hours without drying, or the nitrate of silver crystallizing; it might probably have been left there for all time to come without changing in appearance. It did not occur to me at the time to try if its sensitiveness had been preserved, but I intend to do so at some future time. Working under such conditions proved very troublesome. No means of warming the plate; the whiskey sold at the hotel was so weak that it would not burn. A wood fire could not be made on account of the smoke, and our supply of alcohol was hardly sufficient to set fire to our magnesium. We managed finally to get some alcohol in Cave City. Having no lamp, we were obliged to burn it in a reflector, and dry the brush and warm the plate over it; this plan we adopted after this even in the dry parts of the Cave.

On account of the dampness, and the sand and mud, which, whatever precaution was taken, would get in everywhere, we were obliged to take out every evening our cameras, plateholders, and glass boxes; these had to be dried before the fire, and cleaned before starting the next morning. The glass, owing to the difference of temperature in the Cave (about 59°) and outside, would, as soon as it was brought in the warmer medium, condense the moisture of the air, and the small particles of wood and dust coming from the box would stick to it, thus requiring to be cleaned again. To guard to some extent against dampness and sand, a bag made of India-rubber cloth, to hold the cameras and plateholders, would be useful; the seams should be made tight with India-rubber cement, and the bag closed tightly by means of a string.

If to all the inconveniences mentioned above, you add the bodily discomfort to which one is exposed in climbing, creeping, and squeezing through all kinds of un-

comfortable places, the fatigue of the march over rocky and slippery roads, loaded as one is with the implements of the profession, and, in some cases, the danger to life incurred in placing instruments and reflectors in the most suitable spots, you will agree with me that photographing in a cave is photographing under the worst conditions. Our trip over the river is one that I will always remember. We started at nine in the morning—four of us—Messrs. J. Proctor and J. O'Shaughnessy, Abe (facetiously called our man Friday), and myself, all loaded down with cameras, tripod-stands, chemicals, reflectors, and two days' rations. Passing the Giant's Coffin, Bottomless Pit, Scotchman's Trap, Fat Man's Misery, and the Dead Sea, we arrived at Lethe River, which we crossed in the boat. From there, passing over the *Long Walk*, which at high water is submerged, we came to Echo River, which is from a half to three-quarters of a mile long. Through this we paddled, and passing to Silliman's Avenue, we came to Ole Bull's Concert Hall, of which we made two negatives; then entering the rocky *Pass of Elghor*, we stopped to make two negatives of *Hanging Rocks*, and continued our journey until we reached Martha's Vineyard. Here we took supper, after which we went to look for a convenient place to pass the night; this we found, half a mile further, in a side avenue, very low at the entrance, but high enough a little further to stand up. We made our beds in the soft sand, and, wrapping ourselves in our blankets, soon went to sleep. At six in the morning we arose for breakfast, and, after eating, went immediately to work making two pictures in Martha's Vineyard, two of the ceiling in *Snowball Chamber*, two of some beautiful white gypsum formations, two of the *Cross*, and one of the *Last Rose of Summer*. These spots are all the one near the other, which allowed us to do so much in one day; the furthest spot, the *Last Rose of Summer*, is seven and a half miles from the entrance of the Cave. About five o'clock, we started on our homeward journey, and reached the entrance at eight, thus having passed thirty-five hours in the Cave. I must here acknowledge the valuable and intelligent help given me by Messrs. Proctor and O'Shaughnessy, the gentlemen who engaged my services. They accompanied me on every trip, giving me every assistance, and taking more than their share of the burdens and dangers. Without their help, I would often have been sorely puzzled, and would have given up taking many a picture of great interest. Although not photographers, they very soon came to understand the conditions necessary to success.

I will end my letter by giving you the *modus operandi* of producing a cave negative. Arrived at the spot of operation, two or three tapers are burned to ascertain the features of the picture; choose the place for the cameras (of which we generally use two), and decide from whence the view has to be illuminated. We generally place two-thirds of the lights on the right hand side of the camera, and one-third on the left, or *vice versâ*, taking care not to have the reflectors too near it, so as to avoid flatness. Only when we cannot do otherwise do we place them on the same line of sight, and then we try to raise them as high as possible. The quantity of light required being determined, as also its direction, we get in focus on the principal object. When this is accessible, we place a lamp close to it, so as to illuminate the irregularities, on which, by means of an eye-piece, a focus is easily taken. Other lamps are disposed in the same way in different parts of the picture, thus allowing us to see which parts are sharp, and which are not, and suggesting the alterations to be made. This being done, we determine the exact locality of each reflector. The rule is to have the light as near as possible to the object without allowing it to come in the field; if it does, a lamp placed at the intended spot will be seen on the ground-glass. The tapers are tied together at the top by means of a thin iron wire, at a distance from each other of half an inch; at the bottom they are tied in close contact. A rag dipped in alcohol is put in each reflector, and at a given signal is set on fire by means of a small piece of sponge also dipped in alcohol. The monster reflector holds from ten to twenty-five tapers; the small ones from five to ten. We have used from twenty to one hundred and twenty tapers for one picture; some pictures would,

with the means at our disposal, take a pound of magnesium.

As I said before, we generally use two cameras. The two plates are prepared rapidly, the one after the other; the plates are dried and slightly warmed before collodionizing. The pictures are developed and washed. I have given up redeveloping, on account of a greater liability to a deposit in the shadows. The fixing is done on our return. If any strengthening is required, I use sulphuret of potassium; if this does not bring the negative to the proper intensity, I pour over it a very weak solution of bichloride of mercury, which is followed by a very weak solution of hydrosulphate of ammonia. This method of strengthening requires extreme caution. I may, in some future letter, give you some more details on the subject of Cave photography.

Truly yours,

Charles Waldack.

Mr. Waldack's paper came to us accompanied by about forty prints from the negatives described as taken by him, of stereoscope size. The following are the subjects: "Martha's Vineyard;" "Ceiling in Cleveland's Cabinet;" "Dinner, in great relief" (with five figures); "Back of Giant's Coffin;" "Corinthian Columns in Mammoth Dome," (a fearfully wonderful formation of rocks, leading one to believe almost that it belonged to the ruins of a city underground); "Rocky Cave;" "Angelica's Grotto;" "Hanging Rocks;" "Entrance to Rocky Cave;" "Giant's Coffin" (an immense rock, shaped like a coffin); "Wild Hall;" "Snowball Arcade;" "Bottomless Pit," (3); "Bacon Chamber;" "Bandit Hall," (2), (a terrible-looking place, with several persons at dinner, upon the rocks, and conversing together); "Wandering Willie's Spring;" "Scotchman's Trap;" Devil's Arm Chair," (with a man in it—a most attractive seat!); "Hanging Rocks," (on these, several names chiselled by visitors may be easily and plainly read, showing the excellency of the negative); "Gothic Chapel;" (2). The "Cross Ceiling in Cleveland's Chapel," (indentations or cracks in the ceiling in the shape of a cross); "View near the Dead Sea;" "Gorin's Dome;" "Standing Rocks;" "Lunch in the Cave;" "Ceiling in Cleveland's Cabinet;" "Last Rose of Summer" (in the last two we have a very curious sight; the gypsum oozing out of the rocks has curled around into shapes very much resembling roses or dahlias, and these shapes seem almost to have life and freshness; they are remarkable). Following the above, we have received views of the wild and romantic "Walk from the Hotel to the Cave;" four different views of the entrance to the Cave, which is very small compared with the places inside; a picture, inside the Cave, of Messrs. Proctor & O'Shaughnessy, the gentlemen for whom Mr. Waldack made the negatives; and wonder upon wonders, *an instantaneous view inside the Cave!* Who now shall doubt the abilities of magnesium? This was made by exploding ¾ ounce magnesium filings and ¼ ounce pulverized gunpowder in reflectors. Two-thirds of the light on the right, and one-third on the left. The picture shows the sparks spirting out in all directions, and a picture has been made of the light which made it.

It would be the vainest presumption for us to attempt to describe these amazing pictures.

When we think that Mr. Waldack has been down in the bowels of the earth, six or seven miles from sunlight, and returned with pictures of the wondrous and fearful places therein, we can hardly realize that it is so. It is a greater triumph of photography than anything yet accomplished, and more than any one would have imagined it ever possible to secure, and yet Mr. Waldack is not satisfied. He seems inclined to make some experiments with electric light, by having a steam engine and electro-magnetic battery at the entrance, and conducting the light inside. No one shall say this is impossible. *Photography forever!* Lay the descriptive pen and the delusive pencil upon the shelf! Their prospects are all shattered by the camera, and its giant powers have won the mastery. Mr. Waldack deserves the thanks of the world of science and art, and we hope his views will sell immensely. It is our *duty* to buy them. Ed.

Subscribe early for next year to secure all the numbers.

ON FOCUSSING SURFACES.

BY M. CAREY LEA.

To the remarks, which on a former occasion, I made upon this subject,* I propose at present to add the results of some further experience, and to suggest a new, easy, and efficient method of obtaining an excellent focussing surface.

Bad photographs are as often defective from bad focussing as from any other cause. When a good lens is perfectly focussed, and the resulting negative is printed upon highly albumenized paper, pressed firmly against it, there results a picture with a brilliant clearness of outline, which no engraving, no artist's sketch, can in the least rival. The effect is extremely beautiful. It by no means interferes with softness. It would be as reasonable to say that a landscape could have no softness with a clear atmosphere, and that the best time to view natural scenery was in foggy weather; such a position would not be one whit more absurd, than condemning sharp photographic work as necessarily hard, or even tending to be so. Some of Mr. Wilson's stereograms offer the best refutation, which such an opinion could be met with.

Doubtless much imperfect focussing depends upon the defective surface upon which the picture is often focussed. I have yet to see a good piece of ground glass made in this country,† and I have known photographers to remove the ground glass from their camera, and laboriously work it over themselves, in the hope of getting it into such a condition as would enable them to see some of the fine detail upon it. Such care is exceedingly well bestowed. But all have not the necessary familiarity with the mechanical operations of polishing, grinding, and smoothing. Besides, it is annoying to have to devote so much time and trouble to preparing a plate, which may at any time be broken.

In a previous article devoted to this subject, I proposed several new methods of producing a surface upon glass, with a grain so exceedingly fine, as made it capable of receiving very exact detail. One of these methods consisted in applying a layer of *starch* upon the plate, which in drying leaves a thin opalescent pellicle. The other consisted in precipitating sulphate of baryta in a solution of gelatine, by which means the baryta salt was kept completely suspended in the liquid. A plate of glass was then coated with this opalescent gelatine, and allowed to dry.

Both of these methods gave excellent results, and when I published them, I thought them all that was needed. Especially as the starch process was evidently within reach of every one, and gave most beautiful films.

Subsequently, however, a very serious, and unexpected objection presented itself to both these methods. With time, the films showed a strong tendency to flake off, and leave the plate in spots. These spots continually widened until, in one plate which I had constantly in use, the whole of one end of the film split off from the glass. Nor was it possible to retain them on the plate by varnish, for the grain of these films was so very fine, that the application of a varnish rendered them almost perfectly invisible. The varnish made them as transparent, or nearly so, as the plain glass.

To avoid these difficulties, one way only has suggested itself—to prepare a varnish which should itself have the necessary opalescence. That I have succeeded in doing, and thereby, in preparing focussing plates even better than those prepared by the means before detailed, and at the same time, free from all tendency to peel off. The substance which I employ for this purpose is *tartaric acid.*

I take a good negative varnish made with alcohol, and saturate it thoroughly with tartaric acid. It does not dissolve a great deal, and to get a sufficient quantity into solution, the acid must be finely pulverized, added in considerable excess, and the vial well shaken at intervals for several days. It may then be allowed to settle for a day or two, when the clear liquid is to be poured off.

It is to be applied precisely in the same way as in varnishing a negative, that is the

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* Page 173, *Philadelphia Photographer*, Vol. 2.

† Since the above was written, Mr. B. H. Shoemaker of this city, has had some glass very beautifully ground for me.

plate is to be gently warmed before and after the application of the varnish.

I cannot, of course, affirm that all negative varnishes will answer equally well for this purpose, even if made with alcohol, though there seems no reason to the contrary. That which I used was an old varnish made after Hardwich's receipt, of lac, sandarac, and alcohol.

The grain of the film obtained in this way, is so fine that the smallest print may be read through it with ease, even when the other side of the glass is placed next to it. At the same time it is not too transparent. It thus reconciles the two points, to combine which is the grand difficulty in making a focussing film. For there is no difficulty in obtaining a film of fine grain in many ways, but this quality is accompanied with a transparency which renders the image on the ground glass too dark and indistinct. When it is attempted to focus on such a film, only the strong contrasts of the picture can be seen, a dead branch standing out against a sky, or something similar. But the film which I here describe, renders every part of the picture plain and distinct, and the finest details can be watched as the camera draws out and in to find the focus.

I think it may perhaps give a better idea of the quality of such a film as this, if I describe what it is capable of accomplishing in the way of clearness.

I placed a book before the camera, of clear, but not unusually large type, and at such a distance that the image on the focussing plate was diminished to *one-hundredth* of superficial size, as compared with the original. On this image, with the aid of a single lens of moderate power, the loops of the letter *o*, wherever it occurred, could be made out. Now this could not be done on ground glass —at least, not on any that I have seen—even with a much more powerful lens. For if the grain of the film is not sufficiently fine to receive and show the fine detail, no magnifying can bring it out. A comparison which I made between this plan, and a glass plate which I had roughened with hydrofluoric acid gas, was three to one in favor of the former in point of visible detail.

I cannot close this article without again calling attention to the necessity of focussing upon glass of the same description as that on which the negative is taken. A very large number of negatives, especially in portraiture, are taken upon blown glass. And focussing is almost universally done upon ground glass, which is more or less brought to a true plane surface in the operation of grinding, even if it had not before. Thus the surface on which the image is focussed, and that on which it is fixed, do not correspond in position. I recommend to have the focussing slide furnished with a rebate and springs, so as to admit of easy changing the focussing plate. If the negatives are to be taken on blown glass, let one of average curvature be selected, or of rather less than average curvature, and prepared as above described. But if the photographer is resolved to retain the old fixed focussing slide, and focus upon a plane surface, while he takes his negative upon a curved one, let him at least be sure that his focussing slide and dark slide are so regulated as to repair this evil. When he measures his focussing slide and dark slide together, let him put the plane glass in the former, and the average piece of curved glass, corresponding to that which he habitually uses, into his dark slide. Then closing the back, the pressure of the spring will slightly flatten the curved glass, and bring it into the same condition as will be the negative plate in actual work. Next, lay an iron or thick glass ruler across the frame, rest one end of a stiff card upon the middle of the glass, and with a pencil with a long sharp point draw a line upon the card, where the edge of the ruler touches it, pressing the card close up to the ruler. Repeat this with the dark slide, and if the frame is properly regulated the two thin sharp pencil-lines will be exactly coincident, and form but one. There ought not even be a sensible increase in breadth of the line when the second is drawn. The pencil must be hard; cut fine enough to draw a line like fine steel engraving. I have satisfied myself by actual measurement, that it is easy with a 6H Faber's pencil, properly cut, to rule lines $\frac{1}{320}$ of an inch in thickness. This is accomplished with the greatest ease, and lines of not more than half that breadth might be made if it were an object. This mode of measuring, therefore, unquestion-

ably affords fully as much accuracy as the camera maker can work up to.

It is in many respects far better to make the measurement by transferring the same piece of glass from the focussing slide to the printing slide. Then if the adjustment is found, or made to be, correct, we are certain that the two frames will work together correctly, and we have only to be sure that the glass we focus on corresponds precisely in curvature, or in absence of it, with that on which we take our negative. But if it is intended to focus on ground glass, and take negatives on curved glass, it is self-evident that the slides should be arranged so as to compensate for the difference.

As an example of what may be accomplished with entire ease, by attending to these simple precautions, I may mention the following: A page of a book was taken on which was the commencement of a chapter. On the blank space above the head cf the chapter, there were faint marks of the print on the other side showing through, although the thickness of the paper was not sufficient to have attracted my attention. The negative was reduced to one-fiftieth the superficial area of the original, and with the aid of a glass the words on the under or reverse side of the paper could be distinctly made out, upon the collodion film.

BERLIN PICTURES.

Those who were fortunate enough to receive our July number for this year, will not forget the admirable study therein, made by Messrs. Loescher & Petsch, Berlin, Prussia. Through Messrs. Wilson & Hood, Philadelphia (the only gentlemen we know of who do the art good service by importing foreign photographs for studies), we have received another series of card pictures of children; a number of excellent studies of grown persons, male and female; and some stereo slides, representing indoor and outdoor scenes in the city of Berlin. The ingenuity, skill, and good taste displayed in the children's pictures made by these gentlemen, we have frequently spoken of, and a number of our subscribers have them, we understand. They are mostly domestic, and therein lies their great beauty. Representing the little ones busy with household cares and innocent play, these pictures have a great charm about them. A number of new and amusing ones are in this lot, every one of which is a treasure worth having and keeping.

There is certainly great art displayed in making such pictures, and it is an art well worth much careful study and cultivation.

As we have before said, make good pictures of the children, and you are sure to control the custom of the old folks. It is a well-known fact, that German children are taught to work while very young. Young Hans is put through a course of gardening, and other duties about the house, very young; and Missie Katrina is also made to practise the duties of housewife and nurse at the same age that she receives her schooling. In these pictures the children are represented as engaged in such duties, and the effect is lifelike and natural. It may be that an American papa or mamma would not at first see the beauty of such pictures; for here, when a child is to be taken, instead of its being allowed to assume some graceful attitude peculiar to its little self, it is lifted up into a chair large enough for its grand parents, made to keep in the most unnatural and unchildlike position, and thus taken. It then looks most emphatically as if it was having its picture taken. In Mr. Inglis's, and in the Berlin pictures, we not only have excellent likenesses, but we have most lovely and beautiful *pictures*, that are a joy and a pleasure to look at, and which bring out the character of the child most charmingly. True, some of them are not so severely sharp as we Americans are taught to insist upon; but what of that! We do not care for that in the pictures of children, when we can catch and fix some of their pretty ways, and make a pretty picture, showing the spirit and life of the child.

In one of the Berlin cartes, we have a young scrub showing his new boots. The action of his whole body—the expression of his face—the whole picture—seems to say, "See my new boots!" and will remind many of us of the early days when we were first given the ownership of that important addition to our dignity and possessions; so with the picture of a charming little miss, showing her new slippers. We wish every pho-

tographer could see and study these pictures; it would do them good, and we are glad to know that they may be had in this country.

We think that in this direction lies one of the ways in which photography may be much improved; and we trust that our feeble words may induce some to *cultivate* and *study* the *art* of making childlike and natural pictures of the graceful little ones.

Those of the children of *larger* growth are also capital specimens, very skilfully lighted, and teaching most valuable lessons to those who desire to improve and really want to study their business. We wish we were able to place a number of them in the hands of every one of our readers.

The stereoscopes are also very inviting and attractive, and it is really wonderful, alike with the children's pictures, how such results are secured. *Grandpapa's Stories*, represents a lovely little maid of three summers, standing with upturned face, listening to the tales "Grossvater" tells, while, with book in one hand, he leans over and supports the little one's chin with the other. The accessories are capitally arranged. *The Difficult Task*, represents grandmama imparting the first lessons in spinning to a maiden of twelve. In *Making the Cake*, two young ladies figure in a scene not as common as it ought to be in our households in this country, we fear. While one stirs, the other pours into the bowl the wherewithal to make the cake. The *Serenaders*, is a picture of three Quixotic-looking, ragged individuals, playing lustily on their instruments to an apparently empty house. *Grandpa and His Pets*, are in two pictures. In one, the pets amuse grandpa by their childish capers, while in the other he amuses them by aping the fiddler. They must be seen to be appreciated, and plenty of them are for sale.

The formulæ used by Messrs. Loescher & Petsch, promised us some time ago, have been in our hands but a short time, and are as follows:

COLLODION.

Alcohol, . . .	500 grammes.
Ether, ...	500 "
Cotton, ...	$11\frac{1}{4}$ "

Add:

Iodide of Amm., . .	5 grammes.
" Cad., . . .	$2\frac{1}{2}$ "
Bromide of Cad., . .	5 "
Iodide of Potass., . .	5 "

Dissolve the latter in alcohol.

DEVELOPER.

Protosulphate of Iron, .	45 grammes.
Water, ...	1080 "
Alcohol, ...	45 "
Glacial Acetic Acid, .	30 "

INTENSIFIER.

1st. Pyrogallic Acid, Citric Acid, and Water.
2d. Solution of Nitrate of Silver, 40 grains to the ounce of water.

Silvering solution for paper, 60 grains.

TONING BATH.

Water, ...	200 grammes.
Borax, ...	5 "
Gold Sol. (Chlor. Gold & Sod.),	15 "

Fix in hypo of usual strength.

PHOTOGRAPHY AMONG THE INDIANS.

III.

Dear Journal:

I am still in the vicinity of Fort Phil. Kearney, having been established in a log house with a detail of wood-choppers, just at the foot of the Big Horn Mountains. The block-house is built of pine logs in a circular valley strewn with gray boulders, and covered with a heavy growth of pine timber. The Piney Fork comes down through a rough romantic gorge in the mountains, and rushes by it with a ceaseless roar, scattering its foam and spray over the rocks that fill its channel. Here I have been waiting for the medical supply train to come up, to get some chemicals, being at present in a "stick;" but, though unable to make negatives, I have been enjoying the climate and scenery, both being delightful. Last week I took two days rations, and climbed the mountain, just after sunrise. It had rained the day before, and clouds of mist were rising over the plain below me, an ocean of brilliantly illuminated clouds, with now and then a dark island where a hill-top stuck up above them, stretching away until it blended with

the sky in the smoky distance. The cool breeze from the mountains rolled it back from their bases, and the valley of the Piney stuck out with its dark forest like a cape. Passing over the first range, on the opposite side of which, from the block-house, the stratified rocks have been upheaved, and stand at an angle of 35°, being broken off square, and present a precipitous surface of 500 feet, sloping each way toward the gorge. The precipices on each side of the Piney stand up perpendicularly over 1000 feet, and, through this opening, the Piney valley, the plains, the distant fort, and De Smale's lake, give a long and picturesque distance, while below, the Piney foams through piles of immense blocks of stone, that have become detached from the cliffs above. These interspaces are filled with pine, fir, and aspen trees, which also clothe the sides of the mountains below the cliffs, and make them contrast finely with the bare plain beyond. Beyond the first range the rocks are primary and igneous. My path lying on a ridge above the stream, I had to climb up and down hill, each eminence being crowned by an outcrop of trap, that sometimes stuck up perpendicularly thirty or forty feet. The sides of the ridge next the stream were covered with loose rocks, that seemed to have been upheaved, and then shaken down again. The ground is covered with burnt pines that had been prostrated by the wind; over these I had to scramble for five or six miles. As I came around a pile of rocks I surprised a flock of ten mountain sheep; they are, to all appearances, much like domestic sheep, only their horns are three times as large: they soon let me see their tails. As they rattled over the dead trees, they frightened three large elk does, who joined them in the race. About ten miles from the block-house I came to the live timber, and before entering it I had a fine view down the gorge, looking right over the tops of the first mountains I had climbed. After entering the timber, I followed a game-trail, and soon passed down into a valley where there was an open glade, with a stream of clear water running through it. The grass was tender and young, the spring flowers in bloom, and I regaled myself with a mess of fine ripe strawberries. There were many deer and elk tracks about. After resting a while I started on again. Just as I entered the woods, I saw three large buck elks lying under a tree, and had time to take a good look at them before they saw me. They were as large as mules, a reddish Durham color, and their horns, with many antlers, were more than three feet long, and were at least six feet from tip to tip. They saw me, and all springing at once, cracking their horns together, tore away through the bushes. Going on, I followed a well-beaten path through a magnificent pine forest, seeing many deer and hearing them snort all around me. Some of the bucks (red deer) were twice the size of the specimen in your Academy of Natural Sciences. The woods were full of whortleberry bushes, and I enjoyed my fill of them; they were red and small, and tasted like whortleberries and ripe apples. Coming to the end of the timber, I found myself on a rolling prairie, two miles wide and three miles long; it was rather barren, but grew some buffalo grass. Crossing it, I passed down into a valley, and found a stream of water twenty feet wide, in a narrow valley. Looking down stream I saw something large behind a small pine, and stepping to one side I found myself face to face with a huge buffalo bull, who seemed to be regarding me with as much curiosity as I was him. We stared at each other with mutual surprise and wonder, when, as if he meant to satisfy my curiosity, he first turned broadside to me and then showed me his tail as he galloped off. I was now at the base of the snow-clad Mountain, Big Horn, himself. Here I ate my dinner, rested awhile, and then started for the snow through a small growth of pine for three or four miles, when I came to a jumble of large angular rocks, over which I climbed all the rest of the day up a moderately steep slope. At sunset I stood on the wintry summit, and saw the last rays of light illuminate another snowy range further on. I had been in snow in August, and could see down over all the mountains I had climbed, and away, away for hundreds of miles over the plain. I then turned to look for a place to sleep, but could find none level and large enough to lie down upon, so

I turned and went back by moonlight till I found a rock sufficiently large and level for a bed, when I ate my supper, and wrapping myself in a buffalo robe, slept soundly until sunrise. Feeling comfortable, I laid still, and waited until it got warm, and then getting up I had a splendid view of the mountain-side, with its jumble of rocks; the prairie below, with two beautiful little lakes, by one of which a herd of thirty elks were feeding, while six buffaloes were pasturing to the left of them; then down over the mountains below, with their pine forests, and then the vast plain with the Piney foaming down from the snow through its long gorge, and then winding off with its fringe of green trees far away by the fort, and De Smales Lake to the right, glittering in the morning sun. Up and down to the right and left the ranges of mountains stretched away, peak upon peak, for a hundred miles or more. I found but one kind of animal in this high range, and they were a little larger than rats. They were gray, with short ears and tails, and bleated like young lambs; they live in the crevices of the rocks, and make nests of grass and flowers. They jumped over me while I was lying on the rocks, before going to sleep. I returned by nearly the same road I travelled out, excepting that I kept nearer the creek, and had a rougher road of it. Found plenty of raspberries among the rocks, some equal to the finest Antwerps I ever saw in a garden; and in a valley, in the afternoon, I saw a large black bear picking berries; he was as glossy and handsome as a Newfoundland dog, and quite as large. When he saw me he quietly walked away, and made no show of fighting, though I was within twenty feet of him. I got home after sunset, tired and hungry, having travelled fifty miles in two days over anything but a smooth road.

A few days afterwards, one of the choppers, Mr. Wilson, went with me back to the game country, hunting. We saw some elk, but they were too far off to shoot, and as Wilson made so much noise, I parted company with him; but he had not been gone long, before I came across a large grizzly bear. I was about firing a ball into his rump, but, fortunately, thought what he was in time; had I fired, you would have received no more letters from me. He showed fight, but at last concluded to let me alone, and I had no disposition to attack him; he was as tall as an elk, and I guess, would weigh fifteen hundred at least. One lick with his paw would have settled my coffee for me instantly.

I hope next month to tell you I have made some magnificent views. To-day I found out that charcoal, from soft wood, if well pulverized, will put a better ground on glass than the finest emery. I broke my ground glass, and had to make another. After trying to get sand fine enough, by running water, I pulverized some coal, and with the bottom of a bottle I got a fine ground surface, and recommend prepared carbon, when it is necessary to draw a fine focus. I now have a good climate and good scenery, and expect to turn out something fine. Expecting to have to remain here all winter, I shall be able to do justice to this interesting locality.

Yours truly,

Ridgway Glover.

August 29th.

FORMULÆ FOR CHILDREN'S PICTURES.

BY J. INGLIS.

Our readers were no doubt charmed and amused with the picture in our last number. We regret that our space would not then allow us to publish Mr. Inglis' formulæ for making such pictures, but we believed they would not spoil by keeping, and now print them fully. In his letter to us, Mr. Inglis says, "I use for my bath for negatives,

Silver,	45 grains.
Water,	1 ounce.

Let it stand in the sun until it becomes perfectly clear. I generally find my bath to work best, when I add about $\frac{1}{3}$ of an old bath to a new one about 50 grains strong. I can get a cleaner negative, with very much less trouble, immediately, as the old one iodizes the new. I do not mean an old one that will not work, but old on account of having been weakened by much work. By this means I keep my bath in first class order.

I never experience the trouble in hot or cold weather, that I used to when I practised making a new bath for every little fog or appearance of pin-holes, which used to be very often, especially in the afternoon of a hot day.

Next then is the collodion, which I do not think can very easily be surpassed.

No. 1.

Alcohol,	8 ounces.
Ether,	8 "
Iodide of ammonium,	65 grains.
Iodide of cadmium,	40 "

No. 2.

Alcohol,	8 ounces.
Ether,	10 "
Bromide of cadmium,	80 grains.
Iodide of ammonium,	70 "
Cotton,	80 or 90 "

As every photographer has a taste of his own, as to what is the quality required to make a first-class photograph, I will leave the mixing of these two collodions to their own judgment, after telling how I mix them for my use; generally half-and-half, but sometimes, owing to the alcohol, ether, iodides or cotton, I do not know which, I sometimes find them to work very different, and when such is the case, I add more of one and less of the other. For instance, if I wish to get a fine clear negative, sufficiently intense without any redeveloping, I add a little more of No. 2 (as my taste of the good quality of a photograph is not in a bold, clear, hard print), enough to give the negative quite a foggy appearance. That is generally the kind of negative that will produce a proof full of all the beautiful half shades, which, in my estimation, is necessary to make a first-class photograph. After having the collodion to your taste in that way, you will next have to get your developer as carefully proportioned; and as the light is more or less strong, you will have to change the strength of your developer also. In a strong light when the sun is shining the developer will need to be at least one third weaker, and in weak light it will have to be that much stronger. One of the most important things that I have yet experienced, is to make a soft negative in a very weak light. When a negative is a little underexposed, you always find the high lights nearly intense enough with the first development, while the deep shadows are as clear as pure glass, and a very great want of the middle shadows (the heart of the photograph). To remedy this evil to a very great extent, instead of throwing over the exposed plate as small a quantity of developer as possible, and taking care not to lose any off the plate, so that you may get as much intensity as possible, throw over full enough to sweep off every particle of silver that can be washed away, and almost as soon as you see the image beginning to appear, renew the dose, giving it three or even four new applications of the developer, until you see that there is no possibility of it being further brought out; then, of course, stop and wash your plate, but never stop developing as long as you can bring anything more of the image out, unless you have overexposed the plate, when it will be necessary for you to be careful not to let any of your developer fall off the plate, and also to use as little of it as possible. Otherwise there will be such flatness, that a proof from such a negative would appear as if it was all half shadow; there would be neither dark shades nor light ones; but where the light is good, and the exposure correct, there is no necessity for any of these precautions, unless it be in a great many kinds of collodions which give too much intensity; in such cases you want to use the developer the same as if it had been in a weak light or underexposed; but by having these formulæ for collodion, you can have exactly what you want, as No. 1 gives very hard intensity, and No. 2 total flatness, so by using them with some judgment, you can never go wrong for any effect whatever. The quickness of it is remarkable, as you may see by the picture of the child. The exposure did not exceed 3 or 4 seconds at most. Taken with a 4-4 lens (Voigtlander's), it is, I think, pretty quick work. My re-developer is citric acid and iron, with a drop or two of silver. My ordinary developer is, 1 oz. of a saturated solution of protosulphate of iron, acetic acid 1 oz., alcohol $\frac{1}{2}$ oz., water 16 oz., more or less, as the light or temperature may be.

From Mr. Inglis, we have received several pictures of carte-de-visite size, all of that one little curly-haired boy. There can be no doubt but what the child has been well drilled, and that, moreover, he is a real little actor. The pictures show what can be done with such subjects. The child seems to have entered into the spirit of the thing, and, with a wonderful control over his features, has given us some very amusing pictures of his tiny, pretty face. We have him in a chair, with his finger in his mouth, head reclining, his forsaken toys lying around, and he looking the picture of discontentment and displeasure. Again, we have him peeping from behind the chair, with face overflowing with mischief. A third represents him showing his new shoes. In the fourth and fifth he is going through the process of making his mamma's photograph. Mounted on a chair at the camera, watch in hand, he is making the exposure for his maternal, while a capital picture of himself is being taken. The last two of the set are particularly fine. In one, he is sitting backwards on his hobby-horse, with its tail in his hands, and he the picture of boyish glee. In the other, standing on a table alone, he appears to be full of fear, and crying lustily, though in neither case moving enough to blur the picture. The effect is very amusing, and the negatives must have been taken very quickly indeed. They are certainly very creditable in that particular line.

Ed.

OBITUARY.

Our apprehensions concerning our Indian correspondent, Mr. Ridgway Glover, have proven too true. On the 14th of September, he left Fort Philip Kearney, with a private as a companion, for the purpose of making some views. It was known that the hostile Sioux were lurking around, but, knowing no fear, and being ardent in the pursuit of his beloved profession, he risked everything, and alas! the result was that he was scalped, killed, and horribly mutilated. In another column our readers will find the last letter they will ever read from him. It was received by us some time after his death, as letters from that direction come slowly. We regret exceedingly that his career should have ended so suddenly, and that his mission should remain unfulfilled.

Ridgway Glover was born in this city, and belonged to the Society of Friends. He was a man of some means, but, loving the photographic art, took it up and became a very successful animal and landscape photographer. He was rather eccentric in his ways. We have often been amused at his odd-looking wagon as it passed our office window, and as frequently wondered that he secured as good results as he did. But he had his own way of thinking, and cared very little whether any one else agreed with him or not. He would never use a tripod, prefering a couple of heavy step-ladders. The Roettger triplet was his special pet, and nothing could induce him to try anything else. We shall not soon forget our first acquaintance with him. A rough, shaggy-looking fellow entered our office with two foolscap sheets full of writing hanging in one hand, and with very little ceremony threw them down before us, remarking that there was an article for the Journal, and walked out. We promised to examine it; we did so, and next day it was our painful duty to inform him that his paper was of no use to us. This brought us another foolscap sheet full of abuse and condemnation of ourselves and the poor innocent *Philadelphia Photographer*. We used about six lines in replying to that, and were again favored with a fourth sheet crowded with apologies. That was his nature. Impulsive, generous, and goodhearted, to a fault. No one suffered if he could help them. The study of the red man was a favorite one with him, and he asserted his belief that they would not hurt him. He was possessed of a good education and considerable poetical genius, displays of which we have been privileged to see. It was his desire and aim to make views of the entire route across and beyond the Rocky Mountains, but his untimely end has frustrated that purpose. "Poor Glover!" say those who knew him. Would that he had met a better fate, but we hope and trust that he is in a better land.

KALEIDOSCOPIC PHOTOGRAPHY.

It has no doubt occurred to the thinking photographer that it would be a great thing if the varied forms and shapes presented to the eye by the kaleidoscope could be photographed, and that such photographs would be an immense help to the manufacturer of wall-paper, carpets, calicoes, oilcloths, stained glass, and other ornamental articles. This thought was suggested some time ago by a correspondent of *The Scientific American;* and about the same time a paper on the subject was read before the French Photographic Society by M. l'Abbé Laborde, a translation of which we find in *The News:*

"The variety of designs presented by a kaleidoscope when turned round is familiarly known to every one; yet we are often surprised at the appearance of very curious and unexpected forms, which we see disappear with regret.

"I have endeavored to represent them by photography, and the means I employ are as follows. I do not give them as excellent in every point, for I have only turned to account the objects I had at my disposal. I employed a quarter-plate camera, with its lens. In the groove of the frame a thick board was fixed, with a hole in the middle, into which the kaleidoscope was introduced. The small aperture through which the images are viewed was in the interior of the camera, and the axis of the instrument placed exactly on the prolongation of the axis of the objective; this latter is inserted in the ring in the front of a camera of long focus, and fixed in that position. The whole is then placed on an inclined plane, so that the light from the sky illuminates directly the objects reflected in the mirrors of the kaleidoscope. Instead of turning the instrument to produce the different arrangements, it is easier to apply some plain glasses upon which fanciful objects have been previously fastened. The regular figures which result are depicted on the ground-glass of the camera of long focus, and the images are focussed direct without being reflected; this portion is naturally more lighted than the others. It requires several minutes of exposure to obtain a picture on the collodioned plate. We cannot focus the portions of the image which are several times reflected, for they appear in the objective as if they came from greater distances; they lack distinctness, and they also exhibit the defect of planitude in the mirrors.

"Notwithstanding these imperfections, I believe I have attained the aim I proposed to myself, which is to place before the eyes of those who are occupied with stained glass, paper-hangings, and other kinds of ornamentation, very varied patterns, which photographers can supply by the hundred.

"I cannot pass over in silence another application of this instrument, although it is in some measure foreign to photography. On the surface of a disc of glass I glue a host of flat objects, such as paper patterns, small leaves, mosses, lichens, &c., and place them as near as possible to the external end of the kaleidoscope; and, by a mechanism which it is unnecessary to describe, I make the disc turn slowly, and thus present them successively to the inclined mirrors. We then perceive a series of changing figures depicted upon the ground-glass, among which we can select those best suited to be fixed by photography.

"In a room completely darkened, we can project the images upon a stretched canvas, which will admit of their being seen by many persons at the same time. We must then bring the kaleidoscope nearer to the objective, in order to increase the dimensions and distance of the images, and illuminate the disc by a strong light; in a word, it is a magic-lantern, in which we replace the painted slides by a kaleidoscope. If, instead of objects glued upon the glass, we apply various tints mingled, and thrown haphazard upon the surface of the disc, the figures receive the colors, and in their unexpected evolutions are very pleasing to the sight."

Mr. Walter Woodbury, whose photographic brain is always actively at work, has also given this subject much study and practice, and publishes a very interesting paper on this same subject in *The News.* As this application of photography may be turned to considerable account, we also publish his process below:

"The simplest way is to photograph the ob-

ject to be produced kaleidoscopically through the kaleidoscope, and thus obtain a negative of the image and its many reflections; but this method has the drawback of each reflection being weaker as it is reflected more and more. By adopting another method, this difficulty is overcome, and, though rather more troublesome, gives a finer result.

"The negative of the object should be taken on a small piece of mica, as it has to be printed from on both sides, as in the design formed in the kaleidoscope each segment differs from the one next it, being reversed.

"Take a piece of thin black paper, and, having drawn a circle on it, divide it into 8, 12, 16, or as many equal segments as required; then cut out one of these segments, and mount the talc negative with a little gum to the opening. The appearance of the circle will be as in Fig. 1. The notches

Fig. 1.

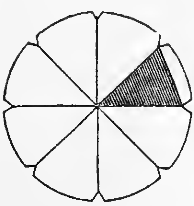
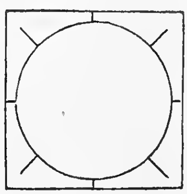


Fig. 2.



at each division are for the purpose of allowing the lines on the sensitized paper to be seen and registered. Now take a piece of sensitized paper, and mark with the compasses in the same manner, but merely at the edges, as in Fig. 2.

"Now take a piece of board, covered with flannel, and lay the sensitized paper on it, and place the disc holding the negative over it, putting a pin through the two centres. The lines on the sensitized paper are then brought to correspond with the notches in the disc, and a piece of glass being laid over the one-half, the whole may be held together by two American clothes pegs, and the printing commenced. It may be easily examined during printing; and when sufficiently exposed, the disc must be turned round until the next segment but one corresponds with the negative, and so on until the four are done. The pin must then be taken out, and the disc reversed, and the alternate spaces printed on.

"The result will be a pretty kaleidoscopic picture, and which may be varied considerably from the same negative by altering its position in the opening. A group of flowers, or single flower, a bit of moulding—in fact, almost anything—will produce a beautiful design. By copying subjects in line, and by some of the many photo-engraving processes, I have no doubt that these designs might be transferred to copper rollers, and used for calico or other printing."

We can easily conceive how beautiful the photographs made in this manner may be. There is scarcely a limit to the variety of shapes; and, we think, some enterprising photographer might make a small fortune by utilizing and pushing the process.

LECTURE ON PHOTOGRAPHY.

BY COLEMAN SELLERS.

Third Lecture—Continued.

Chloride of gold is prepared by dissolving gold in aqua regia, and evaporating to dryness. Aqua regia is nitric and hydrochloric acids combined. The salt is always left in an acid condition, *i. e.*, with an excess of acid, for if all the acid be driven off, the neutral salt is too easily reduced to the metal form again. We, therefore, keep the gold acid, and when wanted for toning add to it some carbonate of soda to neutralize the acid. Into the gold solution in the graduate I throw a small piece of litmus-paper; this paper loses its blue color when in contact with an acid, turning more or less red, according to the strength of the acid. When soda is added to neutralize the acid, the blue color is restored to the litmus-paper. In daylight the solution would look yellow; when the soda has been added, the yellow color gradually goes away in the formation of aurichloride of sodium. This reaction takes place quicker when the solution is exposed to sunlight.

There is a reaction taking place in this solution at the present time; that reaction results in what I have said is the aurichloride of sodium. In that condition it is best adapted to produce the proper tones to the

print. It is very necessary to have every vessel used in toning quite clean. I pour the gold solution into enough water to cover the prints in this case with about one quart. The quantity of water is not important; use only enough to well cover the prints, with a sufficient quantity of gold in it to answer the purpose. In this solution we immerse the prints; they should be immersed two at a time, and the toning process would be much more rapid if the water be warm. Now, while they are toning, I will make a few remarks. This toning process is the substitution of gold for silver. I would mention, in the first place, that this is a print upon plain paper; it is toned much more rapidly than albumenized paper prints, which require a much longer exposure to the action of the gold. The gold takes the place of the silver, and then there is an agreeable color produced. The prints which turn yellow with time have not been toned with gold; they were toned with sulphur, and not with gold. Formerly, when it was the custom to tone and fix at the same time, the gold for toning being mixed with the hyposulphite of soda, the first few prints were usually permanent, but the solution seemed to improve with use, and to tone more rapidly. This was when the gold had been exhausted, and sulphur tones were being produced.

Now, while they are toning, I will allude to another kind of positive, which has lately come into vogue, which can be explained now without interfering with this process. I allude to the porcelain pictures. You see here two specimens of this kind of printing; they are made on white glass, or upon porcelain, or upon any hard vitreous substance. There are a great many ways of producing these pictures. The surface of the glass, for instance, may be coated with albumen containing sodium or common salt; then it could be silvered, and printed precisely as the paper print. There are, however, objections to that way of making them; it is very troublesome. But the new process which has been lately introduced, which brings into use a collodion process, is nothing more or less than the chloride of silver in collodion. In order to prepare the collodion for this purpose, in the first place a certain amount of chloride of strontium furnishes the chlorine element; nitrate of silver is also added, and thus, a chloride of silver, with some excess of nitrate, exists in a finely divided state through the collodion.

Now, in this vial is some of the chloride of silver prepared in this manner. If this be flowed over the surface of the white glass (here is a sample of the glass used)—if the collodion is flowed over the surface, and afterward allowed to dry, we would have a film containing within it a quantity of chloride of silver, and some little free nitrate of silver. Then we would have the plate in exactly the same condition—have it all ready for printing—as silvered paper is. It would require only to be placed in contact with a negative and exposed to produce the print. To hold the negatives in contact with the plates of glass, and to be able to look at them, was a problem which puzzled the operator, and those who are engaged in inventing various kinds of apparatus for the photographers. The solution of the problem has been perfected by Mr. Chapman. There are a great many different kinds of frames for the same purpose, but this seems to have manifest advantages over the others. It consists of a frame, with a little vice at one end of it, in which a piece of paper or porcelain can be screwed fast; in this part, in a similar vice, a negative can be placed. These two, being closed together, will bring the negative and paper, or porcelain, close in contact with the film. A flexible joint can be shifted backward and forward till you see the entire surface in contact, and that a uniform pressure is exerted on the negative, in which condition it can be placed in the sunlight, and the print be taken, examining it in this manner. You can then see how the print is progressing. You see, I have a print here, and can open it to show the progress which has been made in the printing. Sometimes it is not desirable to have the whole picture printed; some people prefer what is called a *vignette*. These are made by surrounding the head by some pieces of paper, so that the light or actinism is not transmitted through any part of the negative but that desired; sometimes, also, with a block of wood, with a hole in the centre. I have here, also, another made

of metal; that is placed over the head, and fixed fast to the negative and to the glass by means of these little springs. Now, if we were to expose it to a bright sunshine, the rays of light passing parallel through this would make a sharp shadow, and prevent the proper degree of graduation, to prevent which, when exposed to sunshine, it must be continually moving in the hand; the same in regard to the paper prints.

A great deal of trouble is saved by covering this opening by tissue-paper, and then exposing it to light, and letting it stand still. In some places, however, they do not use this cover at all. They take an ordinary burning-glass, and allow the glass to be moved backward and forward, and to gradually come in contact with the light; by this means, a large amount of light is concentrated on the negative. There are a great many vignettes made in this manner; these I have here to show you are made with the burning-glass. I am now pouring the mixture of the chloride of silver and collodion upon the plate; then standing it away in the dark to dry, you have the plate in a proper condition to put into the frame and print. There is no silver or other solution required. The process has the advantage of simplicity; and, what is more, you can go to the places wherever they sell these materials—at Wilson & Hood's, for instance, on Arch Street—and there you can buy the bottles of prepared collodion, with the full directions how to make the pictures, which renders the matter very simple. Now we have these prints sufficiently toned. This immersion in the hyposulphite of soda is intended to remove the unreduced chloride of silver, to take away all that which has not been acted upon by light.

Chloride of silver is soluble in other substances beside hyposulphite of soda, as, for instance, in ammonia, in sulphocyanide of ammonium, and in cyanide of potassium, but the last substance cannot be used to fix prints, as it will dissolve the picture also. See, I will test it on this print. I pour over it a solution of cyanide; it gradually all fades out, and we have a piece of white paper. The cyanide is used to remove the black stains from our fingers, and also from clothing; it can be used to remove the marking of indelible ink. I cannot repeat it too often, that in the photographic processes it is absolutely necessary to have your hands clean. Now, these prints are coming to their proper shade and tone. You observe the change. We put them into hyposulphite of soda. They have not turned red; they are of a deep black. The gold has taken the place of the silver, and we have now the properly-toned print. They merely require to lay in the solution long enough to be sure the chloride of silver is dissolved out of them, and then thoroughly washed, which consists in changing the water very often. If we were to allow these prints to lay in the dish like this, fill it up, and empty it, it would each time carry away some portion of the hyposulphite of soda. It is not convenient to do it. Put the prints in a dish, and allow the water from a hydrant to pass through it, continually stirring them. Photographers in large establishments have an apparatus particularly adapted for that purpose; for they have a large wooden water vat, with a pipe passing entirely around it, perforated with small holes, with strings forming a net to keep the prints from sinking to the bottom. The water, which comes out in jets, keeps the prints stirring around.

Much of the want of permanency of the ordinary photographs depends upon the amount of hyposulphite of soda left in each, or sometimes another action has taken place. They have been put into hyposulphite of soda which has been used a great length of time, and the sulphate of silver has been formed in the bath. The sulphide of silver fades prints, as cyanide of silver would fade them. Very often you find marks on them which have partially faded out; these defects are due to the action of sulphide of silver. There is still another thing which affects the permanency of prints, and yet there is hardly any way of avoiding it. The print, after it is made, washed, and dried, is then mounted upon these cardboards; now, after cutting it of the proper size, and covering it with gum-arabic, it is pasted upon pieces of card called mounts. This paper is apparently very white and very nice, but it has not been made with the same care which characterizes the photographic paper; it has a great many chemical sub-

stances deleterious to the paper prints, and they pass through and fade the print, as in the insufficient washing, so that there is no real security in the permanence of prints. The greatest care may be used, and yet the chemical substance in the card-board will cause them to fail in time. It is desirable to have some process which would prevent this. Many attempts have been made to substitute for silver some other substance.

Mr. Swan, of Newcastle-on-the-Tyne, England, has introduced the process of making carbon prints, in which process there is no silver used at all, but he substitutes India ink. To do it, he mixes with ordinary gelatine which has been dissolved, just as you would ordinary glue, in warm water—it is liquid glue—some bichromate of potash, and the coloring matter with which he intends to make the print—India ink, bichromate of potash, and gelatine. Then he flows it all over the plate-glass, and then the glass is allowed to dry; when entirely dried, it is coated with a film of plain collodion. Now, when it is exposed to the light, a very curious action takes place. Gelatine itself is very soluble; but the bichromate of potash acts in such a way as to render the gelatine insoluble, after it has been exposed to light, to a greater or less degree, in proportion to the extent of exposure, the light then acting to a greater or less extent, according to the transparency of the negative, in some places very deep, in others very shallow. In this condition, it is taken away from the glass plate. The opposite, or collodion side, is pasted on paper, and thoroughly washed with warm water to wash away the soluble gelatine, and leaves the color in various degrees of thickness. Where it is very thin, it would be white; there would be no color. Where the film is very thick, there would be a dark shadow. Now, a picture in that condition would be like a daguerreotype; it would be reversed. So in mounting, he has used a substance from which he can separate it—sometimes India rubber. After sufficient washing, he pastes it upon a piece of paper, turns it down with this side of the negative to the paper, places it firmly in contact, and withdraws the first paper, leaving the print in its proper position in regard to the right and left. Everything is found as in nature. By this means, the beautiful picture on the table was made, which you can have an opportunity of examining after the lecture.

I stated that the want of permanency of certain prints was owing to the action of the hyposulphite of soda in them, with the intention of bringing forward this patent surface-paper, which has been introduced by Messrs. Anthony, of New York. It is a paper in which the surface is superficially enamelled, prepared with reference to the chemical substances in it. I have taken up too much of your time to enlarge on its merits. I hope these lectures will be of some use to you. If you cannot put them into some practical use, you may have got some insight into the way photographs are made.

(Conclusion.)

YOSEMITE VALLEY.

BY REV. H. J. MORTON, D.D.

"Facts," we are told, "are often stranger than fiction," and the experience of almost every month satisfies us that it is so. The wildest fancies of the poet and romancer, are left far behind by the startling developments of human passion, or the strange and glorious triumphs of human skill. Fancy a man saying, in the exuberance of his hopefulness only a few years ago, that the time would come, when he would stand on the shores of the new world and talk with a dweller on the other side of the Atlantic, and get an answer to his questions in less time than it would take to convey a message from one hamlet to another, in the same narrow valley, or on the same limited range of ordinary hills! We should have laughed him to scorn as a wild visionary! and yet we have lived to see this rejected dream of fancy a literal fact, and have felt that "facts were indeed stranger than fiction."

The same remark applies to natural scenery, and has been recalled to our minds by a beautiful series of photographic views, kindly sent us by Mr. Wilson, editor of this Journal, representing the natural features of the Yosemite Valley.

Before praising these views and speaking of the grand impressions produced by them,

we will relieve our mind by an adverse criticism. One cannot but regret that no human figures have been introduced in these views, by means of which the eye could at once measure the immense distances covered by mountains, attained by trees, or swept by waterfalls! We can only judge of the size of objects whose dimensions are unknown, by comparing them with objects whose bulk is understood. A hill may be as a wall of heaven, a tree as a column supporting the majestic roof, yet who will be able to realize these facts, if there are no objects of known dimensions by means of which we can measure the magnitude of wall and column. A man standing by a tree shows us at once, whether it is a shrub, or a superb heaven-piercing pine. A tent pitched at the base of a granite mass, informs us at a glance whether it is a common boulder, or a gigantic mountain, lifted up many thousands of feet above the level of the plain.

A singular illustration of this fact presented itself, on our first visit to St. Peter's at Rome. Entering the nave of that famed structure, the first feeling, as we looked about us, was one of *disappointment!* It was, doubtless, a fine building, but certainly not at all extraordinary, as regarded size. We had seen buildings nearly as vast in their proportions. After pausing for a while we moved forward, attracted by two little marble cherubs supporting a shell on the opposite side of the building. They were apparently a foot high, and might have been appropriate ornaments for a mantle or parlor bracket. We were a long while in getting to them, and they grew strangely as we approached, till at last on reaching them, we found that they were figures six feet high, and that the little shell was a vast reservoir, which we could just reach with the hand, and touch the water which it held! Then the building began to grow—to expand on every side—its vastness was at once recognized. We saw, and understood, that it was of perfect but gigantic proportions. Talking a few days ago, with a distinguished artist in this city, we found that he too had experienced the same disappointment, and had been relieved by the same process.

We had a similar singular illustration of this fact, in one of the superb photographs of the Yosemite Valley, submitted to our inspection! It was the photograph of a tree. The "grizzly giant" it was called, if we recollect aright, and though the tree was manifestly a very fine one, we felt disappointed in regard to the apparent size! The storms of centuries had torn its topmost bough, and indeed had decapitated it. So it stood shorn of its original and just proportions, a giant perhaps, but not a very *great one*—tall, but not particularly gigantic. On looking more attentively and minutely at the photograph, we discovered a group of men at the base of the tree! They were so small that at first, they had escaped notice, but being once seen, their effect upon the picture was magical. The tree rose and rose as we followed up its trunk (from the points where certain definite standards of height were visible), and towered aloft in majestic proportions, till at last the eye, almost wearied with the work of following its solemn shaft, took in the whole stupendous growth, and we felt that we looked indeed upon a grizzly *giant*. A magnificent pile of vegetation beside which the grandest pines of our eastern hills or plains, were mere pigmies, and beneath whose great far-reaching shadow the noblest oaks of Windsor Park might grow as simple shrubs. Yes, a tempest might be tearing at the topmost boughs of this majestic Monarch of the West, yet the traveller sitting down by its roots, hear only a far-away murmur, and feel only an occasional wind-waft, swaying lightly the smoke that crept up from his kindled camp fire.

But this is only one of the many photographic views, which open before us the wonderful Valley whose features far surpass the fancies of the most imaginative poet and eager romancer. The magic of art is here truly exercised for our accommodation and delight. Without crossing the continent by the overland route, in dread of scalping Indians and waterless plains; without braving the dangers of the sea by the Chagres and Panama route; nay, without even the trouble of the brief land trip from San Francisco, we are able to step, as it were, from our study into the wonders of the wondrous Valley, and gaze at our leisure on its amazing features. The first idea suggested is, that the land is all rock. That there is indeed no land, if by land, we mean *soil!* But there

is a supply of *stones*, sufficient to macadamize the world, cover all continents with granite cities, and then have an abundant supply remaining for Mars or Mercury, supposing that the former little obscure planet, has any need of stones, when its own density is so great that animals living on it must have solid bodies, unless they expect to be crushed with their own weight, or granting that the latter orb, lurid with a heat seven times that of earth, can harbor living things in want of houses or traversable highways. Rocks tower up on all sides—perpendicular, cloud-piercing, prodigious! A rocky basin receiving into its hollow cavity the tide which tumbles down 2630 feet, first in sheets of solid water, then in foam, and then in mist as fine as that which forms a summer cloud; and then again, condensed into its original fluid state, runs and hides itself away, and lies silent and deadly still, in quiet rocky nooks, or in broad and transparent lakes, reflecting the surrounding landscape so perfectly, that substance and shadow are not distinguishable, and a photograph is as good a picture, when looked at upside down, as when viewed in its natural position. This is eminently the case with the splendid photograph of "Mirror Lake." We were absolutely at a loss at first as to which way we were to hold the print. The clear, sharp figure of woods, and the wonderfully sharp and perfect details of distant rock masses, were all rendered as well by the reflection, as by the real objects represented, and it was only after some study that we saw how the print was to be held and examined. This picture, by the way, of the "Mirror Lake," is one of such wild and singular beauty, that it would grace the walls of any gallery, and the richest frame which the gilder could prepare for its reception. Rocks lie bedded round the roots of trees; rocks pave the plains and border the brooks; and looking on the landscape which represents the scene visible from the "South Forks," it seems as if pine forests and hemlock groves, were engaged, like a countless host of school-boys, during holiday hours, in sliding down the smooth and shining surfaces of rock structure.

The Valley, however, notwithstanding this preponderance of stony formation, is full of fertility and fragrant vegetable life. Travellers tell us of its sweet grass and countless flowers, varied fruit and abundant fertility; and these photographic views show us that all kinds of leaf life and shrub life and tree life flourish there luxuriantly. The trees, when once we get a clue to their growth and height, are manifestly monsters. Thirty, and even forty feet in diameter seems the measure of the mightiest, and their height, if we rightly calculate it, falls little short of two hundred and fifty feet! What pigmies beside these are our noblest hemlocks!

But the impression most vivid, on looking at these splendid photographs, is that of the stupendous size, and amazing perpendicularity of the mountain masses, towering on every side! As to size, we wonder (as we look) that these tremendous heights of solid granite, do not give the world a cant, and make it roll somewhat out of its orbit! And when one measures, even rudely, the real perpendicular height of some of the precipices, he finds that he might count fifty, ere a stone let fall from the brow of its beetling crests, would reach its base and crash into fragments at its foot.

"El Capitan as seen from the Valley," is a wonderful picture in both aspects. Its mass is magnificent and vast beyond expression; it stands up like one of the walls of heaven, and is as upright as it is gigantic. A broad sheet of hazy atmosphere spreads over its face, veiling but not hiding its features, and as the eye slowly follows up the solid wall to its top, where the forests are faintly seen dividing it from the sky, a dizzy sense of danger fills the mind, and we turn for relief to look at the noble pines which fill the middle ground of the landscape.

Gazing on these giant rock masses so majestic, so perpendicular, we naturally ask, "How did we ever get among them?" and then, "How shall we ever get out of them?" "Did we descend by means of a balloon? Shall we be able to escape by means of a ladder?" If so, it must be one like that seen in Jacob's vision, a ladder reaching from earth to heaven! From the accounts of travellers we find that this wonderful Valley is indeed accessible only by two passages, both narrow and difficult, and fit only for foot and horsemen. Thus this strange nook in nature, lies

hidden among the great clefts of the giant rocks, with its own climate and characteristic vegetation, so that a man might live a lifetime in its immediate vicinity, and never know of its existence, or knowing, find out how it was to be entered!

We hardly know how to leave this superb series of photographic views, which the kindness of Mr. Wilson has enabled us to examine at leisure. No language can adequately describe their variety and beauty. When the great Pacific railroad is finished, we may be able to visit these wonderful scenes for ourselves, but in the meantime we must heartily thank Mr. C. R. Watkins, the photographer whose rare skill and indomitable energy have enabled him to furnish to those who live in this eastern side of the continent, such exquisite views of the wonderful Valley of "Yosemite."

SURVEYING BY PHOTOGRAPHY.

BY BENJ. SMITH LYMAN.

The interesting paper in the November number of the *Photographer*, by Dr. H. Vogel, on some modes of applying photography to surveying, makes me wish to suggest one or two other methods of such an application, that occurred to me three months ago.

These methods would be especially adapted to the panoramic apparatus described by Dr. Vogel, but could be used, with easily made corrections, with lenses, like the Globe and the Zentmayer, that give a wide flat field. The camera should be fitted with spirit-levels; and so adjusted that after the exposure, a vertical and a horizontal line passing through the optical axis, can be drawn with a fine point on the collodion film, by the help of a little apparatus that marks the ends of the two lines, while the plate is in the camera. The adjustment of this apparatus to the optical axis, would be similar to that of the cross hairs in the surveyor's telescope. Then, if it is desired to take but one photographic view, a large number of rods, say ten feet long, must be provided, painted black and white in alternate feet; and these must be set up at the important points in the landscape. It is plain, that in the picture, these rods will appear of different lengths according to their distance. They can be measured by a micrometer, either their full length or such a number of feet on them, as may be left visible by the vegetation or other obstacles, and also the distance from their base to the vertical and horizontal lines. The measurement of the length gives the distance of each point from the camera, reckoning the diminution in size proportionate to the distance. The distance, then, from the vertical line in the picture, divided by the length of a foot on the picture of a rod, gives the real distance in feet of the point from the vertical plane of the optical axis. With the distances from the observer and from this plane, the different points can be plotted on paper. Moreover, the level of each point can be determined in the same way, by the distance measured on the picture from the horizontal line.

In case the panoramic apparatus were not used, the measurements made at a distance from the centre of the plate, could be corrected by coefficients theoretically, or experimentally determined; or they could be mechanically corrected in plotting. For the increased size of the objects at a distance from the centre, and their consequent greater apparent nearness could be corrected, for the direction parallel to the optical axis, by measuring their distance in plotting, parallel to that axis from a line drawn through the camera station, at right angles to the optical axis, instead of measuring from the camera direct. Or both micrometric measurements may be corrected by plotting the two uncorrected distances from the camera, and from the line representing the vertical plane of the optical axis, and then producing the line from the camera, until it reaches a distance from the line drawn through the camera station at right-angles with the optical axis, equal to the uncorrected camera distance.

The trouble of making and setting so many rods, and the danger of omitting to set them at points that may prove to be important, may be avoided by taking two views. A base line of ten, twenty, fifty or any other number of feet must be carefully measured, and a camera placed at each end of this line, with the optical axis at right-angles with it, so that the two views shall be exactly parallel. This parallelism may be accomplished through a pair of sights accu-

rately adjusted upon the camera, by which you may sight, from the station at one end of the line, at a plumb line held over the other station. Or a line of indefinite length, fifty or a hundred feet or more, may be laid off by the help of other instruments, at right-angles with the base line from each end of it, in the direction of the views, and the camera may then be so set, that rods placed at the far end of these lines, shall, in each view respectively, send their image upon the vertical line of the glass plate. With two views taken in this way, the distance of each object in the landscape, can be measured by a micrometer from the cross lines on the plate; and the difference between the two measurements to the vertical line in the two pictures, would give the apparent length of the base line, ten, twenty, or fifty feet, at the distance of the object forward from the camera. This length would be inversely proportioned to the distance, and this distance could then be plotted in a direction at right-angles with a line representing the base line. Then the distance of the object on the picture, from one of the vertical lines, divided by the apparent length of the base line, would give the plotting distance to be measured off parallel to the base line, from the point on the paper just obtained. The plotting, then, would be done by means of two rectangular co-ordinates, the ordinate and abscissa; the apparent length of the base line at the distance of the object, giving one co-ordinate, and the micrometrically measured distance of the object from the vertical line, divided by the apparent length of the base, giving the other co-ordinate. The level may be got in a way similar to this last-mentioned co-ordinate, by measuring the distance from the horizontal cross-line, and dividing by the apparent length of the base.

If the panoramic apparatus be not used, corrections of the measurements must be made in the same way as mentioned already for the method with a single view, either by a coefficient or by mechanical construction. After plotting a point without correction, a line may be drawn through it from the intersection of the two cross-lines on the paper (the base line, and the one representing the optical axis), and prolonged until it reaches a distance from the base line produced equal to the distance of the point from the intersection of the cross-lines.

It is evident that the base line may be made vertical as well as horizontal; that is, the two pictures may be taken, one a certain distance exactly above the other, as, for example, from the upper and lower windows of a house.

Of course, the larger the pictures the greater the distance to which the measurements can be carried with accuracy.

Although paper copies of the pictures would be unfit for making the measurements, yet they would be useful for keeping a register of the measurements made on the glass plate.

These photographic methods of surveying would plainly be applicable chiefly in an open country, but in a wooded region lines might sometimes be cut through the woods and marked by rods, as in the first method, and yet time and labor be saved to the surveyor.

PHILADELPHIA, 10th Nov., 1866.

LENSES AND DIAPHRAGMS.

THIS place is "out of the way," more so than could be imagined. For this reason, I am unable to try the worth of many things that suggest themselves, for the want of material, &c. There is one thing I deem of importance to the craft, that I cannot prove here, I therefore send it to you to lay before the Philadelphia Photographic Society.

In making lenses for the use of photographers, many difficulties have to be overcome, and these must be overcome in unison; one correction must not interfere with another; any one of these difficulties being overcome or simplified, renders the others less difficult. Mr. Zentmayer has, in my opinion, solved the problem of flatness of field, equality of illumination, and depth of focus, these being the *natural result* of his new combination; but I think it will be found that actinic and visual coincidence *is not;* but I feel confident that it may be, and not of his only, but of all makes.

This end I propose to gain in the follow-

ing manner: let a series of extremely delicate tests be made as follows: take several transparent objects of different tints of blue, and let the actinism of each be tested (I think blue, containing a little red, the best); then let one lens of any combination, be made of glass exactly of this color; the actinic being then the only visual focus, this important object is gained, without a doubt of accuracy. The difficulty of obtaining a block of glass of the desired color, without flaws, will soon be overcome if attention be once directed to the subject. I hope this will prove a change of as great importance as I expect.

For trial, a lens might be covered with some blue varnish.

Another thing: thinking of the small aperture given to most newly made lenses for giving flatness of field, &c., it occurred to me that an ordinary lens, treated in the same manner, would give like results, except in time and angle. To prove this, I took a Holmes, Booth & Hayden half-size lens (not remarkable for anything), and put in a central stop of $\frac{1}{8}$ of an inch aperture; the result was great sharpness, equal illumination to the very edge, and an extraordinary depth of focus: the moss on the shingles of a roof, eight feet from the instrument, being well defined, and a small picket fence, 200 yards off, being also perfectly sharp. To test this further, I took a $\frac{1}{4}$ Harrison lens, almost useless on account of its curvature and unequal illumination, only a circle of about three inches being illuminated well; with this unpromising specimen, I used again a central stop $\frac{1}{8}$ inch aperture; the effect was astounding; it gave a picture perfectly sharp, from edge to edge, equally lighted. The depth of focus was so great that a hand-rail 4 feet from the lens was perfectly defined and full of detail, whilst the bricks in a house about 300 yards distant, were sharp and distinct. I took a picture from a doorway, turning the camera to the left whilst it rested against the right door-post; the left door-post is tolerably sharp, and has some detail. I inclose a print from this negative, that you may see for yourself. The door-post was little more than two feet from the lens. Investigations in this direction might be richly rewarded if conducted by some able man; our friend, M. Carey Lea, for instance, can he not give us a rule for central stops? Is there no point beyond which there is no benefit gained?

If you consider the above things worthy of general notice, or of benefit to photographers generally, you are at liberty to use it for that purpose, in any way you see fit.

Yours, respectfully,

JOS. VOYLE.

TUSCALOOSA, ALA., Sept. 25th, 1866.

We thank Mr. Voyle very much for his interesting paper, and trust that the matter will receive attention from those who have given it study. The paper was read at the Photographic Society, but few members only being present, no discussion ensued.

FOGGING AGAIN.

IN No. 33, page 258, of your valuable Journal, I find a very interesting species of *fogging* treated upon by Dr. M. Carey Lea, whose interesting papers I value so much. He attributes a certain marbled appearance in the collodion film, to the "use of a developer stronger than the actual condition of the particular plate would bear." Having had considerable trouble with fogged plates during the past summer, and having tried several ways to overcome the trouble, I at last found that no telescope was needed in my case to see the marbled appearance in my films before they were developed. I discovered such specks and streaks imbedded in the film, as soon as the plates were withdrawn from the nitrate bath, and I discovered two or three ways of getting rid of them. First, I found them to occur when using a collodion too horny and glutinous, and that I could avoid them after allowing some of the ether to evaporate, and the addition of some good pure alcohol or rotten collodion, until a film to suit the temperature was secured. Should this at any time fail, a change of cotton is advisable.

When the trouble occurs after development, the use of hyposulphite of soda for fixing, instead of cyanide, will remove it. In my experience I find the use of cyanide will turn these streaks perfectly black, and that

they show in the print. When using hypo, this will not be so.

Without any reflections upon Mr. Lea's elaborate article, I would be glad if you would publish this.

E. A. Kusel.

Oroville, Cal.

WHY YOU SHOULD TAKE A JOURNAL.

It seems almost nonsensical to write under this title, but as long as there are nonsensical people, we must meet their requirements, and supply what we know they need.

A great many photographers are laboring under the impression that they do not *need* a Journal. They assert that they know their business very well; that their work is good enough, and that a Journal could be of no use to them. Such men do not take a Journal. Enter their workrooms, and you will find them complaining of dull times, or of having just been victimized to the tune of from twenty to fifty dollars, by some rascally peddler of *secret* processes only to be found with the initiated.(?) Such peddlers are always shrewd enough to ask a man if he takes a Journal, and if he does, they will not try their game on him, for they well know that he is as well posted as they are, but the operator who takes no Journal of Photography, is sure to be duped some time. He pays more for his goods because he does not know where to buy; he plods along with old-fashioned primitive apparatus, because he does not know of any new; he worries over every "caution" he gets from bogus patentees; lives in stupid ignorance of all that is going on at home and abroad in his business, and never improves in his work. If some one should come along and claim royalty for using hyposulphite of soda for fixing, or a pressure frame for printing, he would not really know what to do, and would probably have to incur some loss and trouble before he could find out. To such we would say, awake from your crude ideas, and try the other plan a while. You will not regret the investment, but if you do, we will take back the numbers and return your money. There is another class we desire to have a word with. It comprises those who are in the habit of spending an hour or so at the rooms of their stock-dealer every month, to read the *Photographer* and pillage its contents. A stock-dealer, from New York State, who called upon us a few days ago, said: "Your Journal is well patronized at our place. Several of our customers call every month and read it through, and think a great deal of it, but we cannot get them to subscribe." Now to such we would say, is not this a mean way of doing business, and of gaining information?

All photographic journals should be encouraged and well supported. They are the photographer's newspapers and reference books, and their usefulness cannot be disputed or computed.

Had there been good live photographic journals some years ago, the Bromide patent, the Solar camera patent, and the Ormsbee & Wing camera patent would never have been given. It is useless to resist them now, on the silly grounds that they "ought never to have been given." We grant that; but if there had been proper information published concerning them, at the time applications were made for the patents, they never *would* have been given. But there was no means of spreading such information at that time. The patent officers had no means of procuring it, and having no good reason for refusing the applications, were compelled to grant their prayers. Photographers are now suffering for this reason, and being annoyed and vexed, and taxed enough by the claimants to pay for a Journal all their lives. If applications were made for such patents to-day, they could not be granted. *Why?* Simply because the chief examiner in the Patent Office, at Washington, has all the photographic papers and books published, and thanks to them, there is very little about photography that he does not know. The Journal is the medium by which photographers may disseminate their ideas, and when they find anything new, they may publish it before some scallywag finds it out and gets a patent for it. The Journal stands as watcher for the fraternity, and guards it against imposition. It is the grand tyler of the photographic lodge, and prevents the

intrusion and annoyance of unworthy impostors. It should be encouraged for the good it does, and may do. Let it go down and die out, and how soon would the craft be pestered and annoyed by swarms of such parties as we have described. Uncle Sam would remove the tax upon your work, or perhaps inflict more upon you, and you would never know it, until called upon to pay your penalties. New and useful processes would constantly come up, and you would lose money by hanging on to the old. We need not multiply. The editors of the photographic newspapers spend a great deal of time and means in securing such matter as will be fresh, instructive, and pleasing to you. Theirs is no easy path to travel. It is their duty and pleasure to look after *your interests* and those of your business. Intelligent and live photographers, shall they not have an occasional kind communication from you and good lists of subscribers? Work for them among your friends while they work for you, and send in good long lists of *new* subscribers for next year.

Read our list of premiums, and be sure you subscribe for the best Journal.

PHOTOGRAPHIC SUMMARY.

BY M. CAREY LEA.

GERMANY.

Photographic Society of Berlin.—Heese remarks, that the preservation of the whiteness of albumen paper, is rendered easier by the addition of a little boracic acid to the albumen, and that several makers in Berlin use it for that purpose.

Grüne observes, that filtering paper is often impure, and that it may be replaced by *spun glass*, better than by cotton. He fills the neck of the funnel intended for filtering the negative bath. *Asbestos* could be more easily attainable, and better.

Dr. Vogel exhibited a photograph executed on paper upon which a light blue-gray tone had been lithographed as a background. The idea was an English one; the effect was pleasing.

ENGLAND.

Fogging.—A great deal has been written lately, in respect to this subject, most interesting to photographers. Mr. Anthony writes to the *News*, disagreeing with the opinion expressed by Prof. Towler and myself, that the marbled metallic stains that occasionally occur, result from the use of a stronger developer than is wanted to the condition of the bath, and ascribes the fault to the bath itself. He thinks that, in old baths that have been much doctored, especially those which have been boiled, this evil is apt to result.

Mr. Simpson remarks, editorially, that too great strength of bath is often the cause, and cites cases in which a tendency to this sort of fogging has been at once cured by diluting the bath.

In Mr. Anthony's paper, above referred to, he traces the source of these stains to *scum* floating on the bath, which he carefully removes with bibulous paper or a tuft of cotton. There can be no doubt that that cause would be sufficient to produce the result, but it is always supposed that the photographer is on the lookout for such a source of trouble. Plates can never be depended upon when the precaution of keeping the surface of the bath clean is neglected.

Fading of Prints.—The editors of the British Journal publish the result of some experiments made by them, on the effect of the natural influences which act upon photographs when they are intensified. Bad air was tried by suspending a print in a sewer, at some distance over the water level. At the end of three weeks it had faded much, especially in the half tones; the lights had also turned yellow. A print kept two weeks in a box in which a very small gas jet had been kept burning during the whole time, showed distinct deterioration.

Weak Printing Baths.—Mr. Davies writes again on this subject, and comes to the conclusion that results can be obtained with baths even as low as 13 grains, provided that the two following conditions be complied with:

1. The quantity of soluble chloride in the albumen must be administered in proportion. So that, with a very weak printing bath, not over 2 or 3 grains of chloride in the albumen, is sufficient.

2. When the printing bath is below 18 or 20 grains to the ounce, the albumen suffers

very much. Mr. Davies therefore coagulates it with alcohol. He finds a 60 per cent. alcohol sufficient.

Prints obtained in this way, he states that he considers as good as those made on a 60 grain bath.

Action of Nitrate of Silver on Albumen.—Reynolds finds that when albumen, salted with a given amount of alkaline chloride, is exposed to the action of silver solution of various strengths, the strongest silver solutions coagulate the albumen so that it is distinctly less soluble in hyposulphite than when the weaker solutions are used, and the print is much less lowered in tone by fixing. But, on the other hand, when the same nitrate solution is made to act on albumen, salted with various proportions of alkaline chloride, that which contains the least chloride (the experiments were made at from 5 to 25 grains of chloride), resists best the action of the hyposulphite. At least this was true when the resulting coagulated albumen was submitted to the action of hyposulphite immediately. By standing it became more opaque, and then showed much less tendency to dissolve in hypo.

He gives, as the result of his experiments, that a salting of 5 grains to the ounce is that which gives the best results.—*British Journal.*

Explosion of Gun-cotton.—A magazine of great strength, built at Woolwich for the storage of gun-cotton, was recently shattered to pieces by an explosion of its contents, at a time when no one was present. This is believed, as far as now known, to have resulted from a spontaneous combustion.—*Ibid.*

PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

PROCEEDINGS AT THE ANNUAL MEETING, WEDNESDAY EVENING, NOVEMBER 7, 1866.

The annual meeting of the Photographic Society was held this evening, the President in the chair.

The Treasurer's report was read and approved.

The Committee on Mr. Zentmayer's lens reported progress, and were continued.

The following nominations were made for officers for the ensuing year. For President, Coleman Sellers; Vice President, Messrs. F. A. Wenderoth and A. Tilghman; Recording Secretary, E. L. Wilson; Corresponding Secretary, J. D. Sergeant; Treasurer, S. F. Corlies; no other nominations being made, the above gentlemen were unanimously elected.

A letter was read from Mr. Jos. Voyle, of Tuscaloosa, Alabama, on the visual and actinic focus of lenses, and his method of testing the same.

M. Carey Lea sent specimens of Aniline printing, by Professor Dawson, for inspection. Great economy in the copying of drawings is claimed for this process; no negative being required, the copy being made by direct contact with the original drawing.

Mr. Sellers stated that in a conversation he had with Mr. Gardner, of Washington, relative to the visual and chemical focus of the Zentmayer lens, Mr. Gardner stated that he thought the foci were coincident, as he found he obtained the sharpest definition by the most accurate focussing. On his return to Washington he made a series of experiments, to test the accuracy of his statement, and transmitted the results and the method employed to obtain them, to the Society. A careful examination of the specimens fully confirmed Mr. Gardner's views.

Mr. Draper reported a series of experiments that confirmed Mr. Gardner's experience.

Mr. Hurn stated that in a trial with the Zentmayer and Globe lens, the time of exposure was in favor of the Globe; he also asked if any of the members had experimented upon the racking in and out of the lens during exposure, a subject much discussed of late in the journals? The opinion of the members seemed to be unfavorable to the process.

Mr. Draper exhibited a series of pictures of the new size, $4 \times 5\frac{1}{2}$ inches, made by a 4×4 Holmes, Booth and Hayden's tube. the lighting, posing and manipulation of these pictures, showed the most consummate skill and taste on the part of the operator, and were nearly all one could desire in plain photographs. Mr. Draper stated that they were made in his own gallery, which he has altered

after that of Messrs. Loescher & Petsch of Berlin, Prussia, a diagram of which is published in the *Photographer* for July; and that he owed his success in lighting his pictures, mainly to the instructions of that indispensable Journal, in which he had found a number of valuable papers on posing, lighting, &c.

Mr. Hood exhibited a number of pictures by the collodio-chloride process on white ferrotype plates, made by Messrs. V. M. Griswold & Son, Peekskill, N. Y. They were very excellent and novel specimens of photography, showing great improvement over former ones exhibited by Mr. Griswold to the Society. The great variety of tone in these pictures, proved that almost any effect can be produced. Mr. Griswold's very interesting pictures must certainly become very popular.

In relation to the use of collodio-chloride, Mr. Sellers mentioned that canvas could be flowed with the solution the same as glass, and printed in the solar camera.

On motion the Society adjourned.

NEW YORK CORRESPONDENCE.

The first meeting of the American Photographic Society, after the summer vacation, was held October 8th, Prof. Joy, Vice-President, presiding. Messrs. Archibald Russell, John H. Hallenback and Napoleon Sarony were elected to membership.

Mr. Charles Wager Hull read a paper from Prof. John Towler, on "Gordon's Modified Fothergill Process." It was claimed by Prof. Towler, as better than the Tannin in all respects, except keeping qualities. In cold weather this objection was trifling, as the plates would then keep well and long enough; trouble was experienced only in summer.

There was considerable discussion between Profs. Joy, Seeley, and Rood, on the photographic image, as to whether the change was chemical or physical; it was quite evident that the opinion of the learned gentlemen favored the chemical side of the question.

A large series of micro-photographs by Dr. J. J. Woodward, U. S. A., were exhibited and explained by Prof. Joy, and have been fully described in your Journal.

Mr. Hull called the attention of the Society to the collodion furnished by him some time ago to Mr. Rutherfurd, which had proven in Mr. R.'s astronomical photography, three times more sensitive than any he had ever used; it was so sensitive that every plate was fogged by the light of an ordinary candle, at twenty-two feet distance. Mr. Hull was anxious to know the reason; he said it was made exactly the same as other lots furnished Mr. Rutherfurd, alone excepting the cotton; he still had some of the cotton, and was desirous of having some of the scientific gentlemen examine it critically. Prof. Rood promised to do so.

By far the most interesting feature of the meeting, was the discussion which followed upon the exhibition of Sarony's Photographic "Studies," and his "Universal Rest," with which they were made. It was agreed by all present, that they were ahead of anything yet produced; so easy and graceful; having none of that right-angle, straight up and down awkward stiffness about them, so often seen. It is a fact beyond all dispute, that there are only two places where people generally look awkward and ill at ease; one is at a funeral, and the other in a photographic gallery. One of the "studies," of a three hundred pound John Bull, leaning with his whole weight against the rest, satisfied all that *it was a rest*.

The rich warm tones of his prints met with merited approval, being free from that cold, inky tone, and chalky whiteness in the high lights, by far too common a trouble nowadays.

Adjourned to second Monday in November.

The regular meeting for November, was held on the evening of the 12th. Mr. Charles Wager Hull in the chair. The attendance was not large, inasmuch as many of the members, and all the principal officers, make a regular business of looking after celestial matters, and were at this time busy looking for the expected meteoric shower.

Though they were missed, they could not be censured, or expected to leave things celestial for things terrestrial.

Mr. Chapman gave an interesting history of a summer's experience with tannin plates. One of his troubles was hard limestone water. Mr. Weeks said that trouble could be remedied by the addition of about one drachm of nitric acid, to a couple of gallons of water. Mr. Johnson had seen stated in some of the foreign journals, that a few pieces of iron wire would precipitate organic matter from water, and render it fit for photographic purposes.

Prof. Seeley spoke in regard to the difference in sensitiveness between dry and wet plates, the dry lacking subiodide of silver being the reason; this he proposed to supply by producing a thin film of silver on the plate by Cimeg's process, or by exposing to diffused light a sensitized plate, which develop and wash; when dry, coat with collodion, &c., in the usual way; wash thoroughly, and the plate is ready, wet, or after it is dry, for the exposure. The effect may be to reduce the exposure about one-half.

Prof. S. D. Tillman remarked that the subiodide of silver is not necessarily formed by the action of light upon the iodide. M. Carey Lea, in an able paper, to be found in Silliman's Journal for September, "On the nature of the action of light upon iodide of silver," has very clearly shown that pure isolated iodide of silver undergoes no reduction, when exposed to light many thousand times longer that it usually is in the photographic process. Finding the amount of silver and iodine had not been diminished by such exposure, Mr. Lea was led to the conclusion that no chemical change had been effected. What the nature of the change is, we do not yet comprehend.

It may be surmised that a new class of metamers are formed, which are not to be distinguished by atomic arrangement. We can conceive that the atom may undergo a metamorphosis, as the result of a modification of its normal motion, and on the withdrawal of the exciting cause it may resume its original condition. There is a large class of metallic salts which at a low temperature absorb from the air an atom of oxygen, and at a higher temperature part with it. Alternating chemical action may thus be continued for any length of time by a change of temperature. In the case of the effect of light upon the silver haloid, the action may be chemical, even when there has been no change in the amount of the material employed.

We assume in cases of isomerism that there is a change in the arrangement of the atoms, forming the compound. For instance, we give to every one of the nine isomers of Rutic acid a different formula, while, in fact, each consists of ten atoms of carbon, twenty of hydrogen, and two of oxygen, according to the new notation. It cannot, however, be proved that they have the different arrangements of atoms indicated by the formula; yet these formulæ materially assist us in conceiving how different chemical functions may belong to bodies of the same ultimate composition.

Again, we may suppose such chemical action takes place as to produce homologues which are simple multiples of the atom of iodide of silver. Light not only decomposes carbonic anhydride, by means of the leaf, but it probably so modifies the action of the atoms of carbon and hydrogen that they form the homologous hydrocarbons which can be obtained from wood by distillation. In the case of iodide of silver, light may have the power of doubling the number of elemental atoms in a compound atom, but as the number of such doubled atoms would be only one half as many as of the original compound atoms, the total amount of silver and iodine in such a body would remain constantly the same.

The remarkable action of silver haloids may depend somewhat on their typical equivalence or atomicity, and still more on the numerical relations of their atomic weights. Silver is the only common metal regarded as monatomic. In this respect it resembles the four halogens, and differs from all the metals, except those of the alkaline class.

The atomic weight of silver is equal to the difference between that of the lightest and the heaviest halogen. Both the element, iodine, and the salt, fluoride of silver, are represented by the number 127, on the hydrogen scale.

Looking in the other direction, towards

the electro-positive elements, we notice that an atom of silver weighs just nine times as much as an atom of carbon, which is represented by doubling its old combining number; its highest typical capacity being tetratomic. Numerous compounds containing carbon and chlorine are wonderfully sensitive to light, and it may not be too presumptuous to predict that among them may hereafter be found a substitute for the silver salt.

Considerable discussion followed upon Newton's new silver bath for paper, published in the last number of the *Philadelphia Photographer*. Mr. Mason claimed that the only way to get good prints, was to use silver; silver only makes the print; other members thought differently.

Professor Tillman said he would be gratified to learn from the practical photographers present, whether the new magnesium silver solution devised by a member of this Society, Mr. J. H. Newton, and first published in the *Philadelphia Photographer*, is found to be more effective than the preparations in general use. Viewing the compound from a theoretic stand-point, he should, at once, decide that a magnesium nitrate would be found a beneficial ingredient, and one likely to lessen the amount of silver essential to the operation of preparing the paper. Magnesium, although a biatomic metal, forms haloid compounds, often found associated with the alkaline haloids. Magnesium, in the process of combustion, forming magnesia, generates the complete series of waves which produce white light. We know the actinic rays are present from the fact that this light will cause a mechanical mixture of chlorine and hydrogen—inert in the dark, or under the yellow ray—to instantaneously combine chemically, forming hydrochloric acid gas.

The atomic weight of magnesium is just double that of carbon, and as a multiple of the latter, may be classed with silver. Magnesium nitrate should partake of the character both of the silver and the alkaline nitrates.

The remarkable sensitiveness of nitrate of silver to the action of light, and its almost instantaneous destruction of color, in certain substances with which it combines, may result from the numerical relations of the combining weights of its several components, which can be expressed by the old notation, thus, $(N\,O_5) + (Ag) + O$, in which the weight of the first term, 54, is one-half that of the second term, 108. The absence of color, doubtless, is the effect of the interference of two similar series of undulations causing darkness, which may be aptly illustrated by two similar series of air-waves, separately producing two similar sounds, but on commingling they neutralize each other; silence being the result.

The speaker would not at present diverge further from the first point of inquiry. In every photographic process, thus far used, the presence of silver is a *sine qua non;* although a very small proportion of the whole amount employed becomes a part of the picture. Hence it is an interesting problem to determine, by the use of other salts, the least quantity of silver salts required to secure the desired result.

Adjourned to second Monday in December.

Yours, Photographically, &c.,
C. W. H.

NEW YORK, Nov. 16, 1866.

OUR PICTURE.

WE cannot leave the old year behind us until we have given our readers one more lesson—though it be ever so humble—in that important branch of their art, *i. e.*, lighting and posing the sitter. We say *important*, because we earnestly believe that if more care and study were expended in this direction, that photography would reach a much higher place in the arts, and that the work done would constantly and steadily improve.

We are well aware that some of your models are difficult to manage, and that some are self-opinionated and hard to convince that your method or plan is the best, for we are not without considerable experience in that line. But with the first, you must use caution and care, and the greater the triumph if you succeed in *improving* coarse and ugly nature. With the latter class it has always been our plan not to argue or waste any words with them; it always results in your having to give in, and it is best to do so be-

fore you both become antagonistic and destroy all hope of getting a good picture. Let self-conceit have his way promptly, *on condition* that he will afterwards allow you the same privilege. Ten chances to one, when he sees the proofs the next day, he will come around and agree with you. This is troublesome and expensive, you say. Granted; but not half so much so as it would be to take time to argue with an ignorant, dumb, donkey of a customer with a full purse, whose friends may want a picture of his ears because "large ears are a sign of generosity." It is no more than polite that you should ask his preference, and no more than right that you should have yours.

When your sitter enters, arrange your accessories, ask what he wishes, and allow him to sit down and make himself comfortable and feel at ease. Look pleasant, but do not talk too much as a general thing. Arrange and improve the position, fix the light properly on the figure, and fire ahead. The only talking that is really needful, is to make your model forget he is sitting for a picture.

We know of a very skilful physician who goes a little upon this plan. He visits his patient, says nothing, but listens. Looks at the tongue, feels the pulse, and writes his prescription. If he talks, it is generally about something the farthest away from the patient's thoughts, meanwhile, watching him and taking mental notes. Some people complain of him because he does not ask them enough about how they feel, their symptoms, their appetite, &c., &c. Shrewd man, he knows better. He has much to do, and it is to his interest to get his patients well as soon as he can. To do this, he must lead the mind away from the disease as much as he can, and so should the photographer do. We know that it is a real trial for some persons to sit for a picture. Tooth-pulling would be pleasure in comparison, they avow, and it is often the fault of a fussy, old-maidish, chatterbox of an operator. They feel as if they would rather die than move; and they look so in the picture, because they are led to believe, by the actions of the operator, that to move, is death and destruction.

Pay no little attention to the *age* of your sitter. Place the old man in a way to make him look alive, yet not with too much spirit and vigor. The young man should have more life, action, and energy in his pose.

"The lights and shadows on the face, or other parts of the picture, must be managed with the greatest care, in order to produce rotundity, relief, harmony, and life-like effect. When the broad or short side of the face is mostly in shadow, the shaded cheeks should, if possible, be tipped with light, to give it a pleasing fulness and natural-seeming roundness.

"The portrait of a full, round face, with small eyes and nose, and large mouth, should be taken in nearly half profile, so as to show one side of the face in full, with very little of the other side.

"A face of moderate fulness, with aquiline nose and handsome eyes and mouth, should be taken in three-fourths profile; while one having strongly pronounced features, should be presented in a nearly full front view."*

The majority of faces will present a choice of view to the artistic and tasteful eye, which the expert and careful operator will soon discover.

That this is so, *our pictures* this month most emphatically prove. Here we have two pictures of the same lady, taken on the same negative with but a few seconds intervening between the exposures. The negative was made by Mr. Walter C. North, Utica, N. Y., and the prints by Messrs. Henszey & Co., 812 Arch street, Philadelphia. Prints from this negative were sent us by Mr. North, some months ago. The taking of the pictures in the way they are, was purely accidental, yet so admirably would they serve to illustrate what we desired to make plain on this subject of a correct choice of position in portraiture, that we requested Mr. North to give us the use of the negative; and, for the good of the fraternity, and for the sake of art, both he and the accommodating young lady consented, and our readers shall share our pleasure in looking at and studying the pictures. Neither of us offer them as the finest specimens of manipulation to be found, though very good indeed, but only to serve our present purpose.

It will not take any one very long to guess

* Camera and Pencil.

which is, without doubt, the best likeness of the two. In the one we have a beautiful and lovely effect of light and shade on the face, while in the other we notice deep shadows under the eyes and chin, a turned up nose and inky mouth, with very little delicacy or beauty about the picture at all. The latter is repulsive and unpleasing, while the other is a study, and a specimen of work well worthy of imitation by all.

We are certainly very much indebted to the nameless young lady who gives us this privilege, especially so, as most of her sex are very squeamish (we cannot imagine why), about having their pictures in the *Philadelphia Photographer*. However, we know of one more who is willing, and we will, in our January issue, give our subscribers a picture of a lady, from the studio of Mr. Notman, that will make them wonder, wonder, wonder.

Beauty, Ease, Comfort, Abandon, Repose, Elegance, Freedom, Unconcern, and Life, should be evinced in your pictures. The first letters of these requisites will spell what you ought to remember, and make your motto.

Editor's Table.

Our Next Volume.—The present issue brings this volume to a close, and the time is at hand for our subscribers to decide whether or not our relations shall continue. For ourselves, we are prepared to say that we are very thankful for the really unexpected patronage and encouragement we have received during the past year, for the many kind letters assuring us that we were doing a good work, and for the many *proofs* of kind appreciation from all sources. We are also *prepared to go on with our fourth volume*, and to do even better for our subscribers than ever before. We do not feel called upon to issue our Journal more frequently at present, and nothing having been reduced in price, the subscription will remain the same. We have, however, made arrangements to secure all of our old contributors and several new ones, who will contribute regularly to our pages. Dr. M. Carey Lea will contribute monthly as usual, and for this Journal only in this country. (His papers that appear in other American journals are copied, and one month later than our own.) Mr. G. Wharton Simpson, Prof. Charles F. Himes, Ph.D., Prof. Henry Morton, Ph.D., Rev. H. J. Morton, D.D., Rev. A. A. E. Taylor, and Dr. Herman Vogel, will also contribute frequently. We also hope for the usual number of contributions, yea, *greater* than usual, from our *working men*, whose papers are ever welcome. We shall spare no pains to make the *Philadelphia Photographer* what it is now already said to be: "The best photographic Journal to be had." We are printing, for our future numbers, some very choice pictures, which will please our patrons when they see them; among which are a Cabinet Portrait, Sarony's Studies, View of Minnehaha Falls, United States Capitol, Instantaneous Marine Views, &c. &c. With this department we shall take more pains than heretofore. No subject, whatever, or anything that will interest and be of service to our readers, shall be overlooked.

Although we do not issue as often as our contemporaries, we print larger pages, and more of them in each number than any other. Nothing is superior in the magazine line, typographically, and our photographic studies give our Journal an invaluable advantage over all others. We trust our subscribers will take the past for what they may expect for the next year, *and all renew their subscriptions at once*, if they wish all the numbers. We do not stereotype, and therefore may not be able to supply back numbers to those who subscribe later in the year. *Subscribe now*, and make the thing sure. Send in your clubs. See list of premiums in front. We have about a dozen full volumes of this year's issue for sale, and a few more for the six months from July.

The Revenue Law on Colored Photographs.—From Mr. Jno. P. Doremus, Paterson, N. J., and several others, we have received complaints that their assessors have insisted on collecting tax from them for the coloring on photographs. We had before stated that such was not the intention of the law, but, desiring still further assurance that we were correct, directed a series of questions on the subject to Hon. Thomas Harland, Dep. Commissioner of Internal Revenue, on November 10th, and have received a decision from him, dated November 13th, which we extract from below, viz.: "A

plain photograph or other sun picture, worth $2, taken by a photographer and finished by coloring, painting, &c., and sold for $30, is taxable on the $30 for which it is sold, *no tax having been paid on the plain picture* (the italics are ours). If such picture is put into a frame, and sold in that condition, including the frame, the gross sale should be returned for taxation, provided that when a tax has been previously paid on such frame, its cost may be deducted from the gross sale.

"When an artist takes a photograph or other sun picture, simply as a basis or outline of a picture he designs to paint, paints and finishes it, completely destroying he photograph or other sun picture, taken as a basis of his painting, and producing really and absolutely a work of art, the picture or work of art so produced *is not liable to any tax.*"

Our readers, no doubt, understand this now. As all frame manufacturers *pay a tax* on their work and often charge it on their bills, photographers need keep no account of their frame sales.

Pay a tax on your plain pictures, or color them, so as to cover the meaning of the law, and they are free. We are glad to be reassured on this point, for, judging from some of the letters received from our subscribers, we feared we had led them into error. Our subscribers may see this decision at our office, or we will send them *certified copies* if they are willing to pay the fees, and have use for it.

The New Cabinet Size.—The new size continues to attract much attention, and we are pleased to see that our leading photographers are making quite extensive preparations for introducing it. Maintaining the doctrine, that if the thing is done at all, it ought to be done *right*, they are securing new back-grounds, accessories, &c., &c., in order to produce something handsome, acceptable, and likely to become popular. One or two mistakes some of our friends have fallen into already, who have sent us specimens. First, to make the effort to introduce these pictures a success, the desire is, that they should not only be *new in size*, but *new in style.* A print from an ordinary whole plate negative, cut out 4 x 5½, and mounted on a cabinet card, will not fill up the idea of the new size at all. Introduce a few nice, neat accessories, and use something to relieve the back-ground. Something *new* all around is what we want. The *size* is not everything. Our readers shall have a better idea of what we mean when they see the picture in our January issue. We there propose to give them an excellent model to work by, from the studio of Mr. Wm. Notman, Montreal. Secondly, some who are already making these pictures, have started them at a price entirely too low. For the sake of your profession and your pockets, do not do this. It is easier to reduce prices than it is to advance them. Nothing will so quickly kill the new effort as low prices. For your own good, consider this. It is important. We have had a number of letters from our subscribers on this subject, and are very glad to find there is so much interest taken by them. Mr. Notman thinks, that where quality of work is a consideration, that taking *two* of the Cabinet Size on a whole plate is not advisable. He is fast making them popular in Canada.

Mr. R. J. Chute, Boston, has lately been to see Mr. Notman, and writes us a very excited letter on the subject. He is the happy possessor of a few of Mr. Notman's specimens, and thinks he could look at them by the hour. He does not really know which has done him the most good—a careful study of these specimens, or the careful reading of *The Photographer.* Having tasted the benefits of both, he would not like to part with either, and recommends every one in the trade to get both. He says there are some whose *work is good enough.* They never take a Journal. But to others, he would say, *get* some of Mr. Notman's pictures, and study them and *work up to them!* We say likewise. It will help your ideas greatly.

Messrs. Draper & Husted, Philadelphia, have handed us some specimens, showing great beauty in lighting, tone, and finish, and which are excellent in every way except the one we have mentioned. They also make them too low. $5 a dozen is not enough. They should be $9. Such pictures, with a few accessories, will be as fine as y one could desire. Messrs. Draper & Husted attribute their success in lighting, to the instructions given on that subject in this Journal, which they acknowledged at the last meeting of the Philadelphia Photographic Society.

New York Correspondence.—We have made permanent arrangements with C. Wager Hull, Esq., one of the first amateurs of the country, for a monthly letter of gossip and news from New York.

Salad.—Owing to a press of more substantial matter, we are obliged to deprive our readers of their usual dish of Salad this month. A plentiful supply in January.